SOUTHERN CALIFORNIA COASTAL OCEAN OBSERVING SYSTEM

Southern California Coastal Ocean Observing System (SCCOOS)

REGIONAL ASSOCIATION DEVELOPMENT 2005-06 ANNUAL REPORT

NOAA/COASTAL SERVICES CENTER GRANT

Period of Performance: Year 2, July 1, 2005 – June 30, 2006

sccoos.org

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1.0 EXECUTIVE SUMMARY

This year marked significant progress in the development and maturity of the Southern California Coastal Ocean Observing System (SCCOOS) Regional Association (RA). The Regional Association Development Annual Report describes SCCOOS activities that contributed to further development of the Regional Association and the regional ocean observing system, identifies priorities for the future, and challenges to address. We report on SCCOOS efforts in the areas of governance, organization, and management, stakeholder development and engagement, outreach and education, and data management.

During 2005-06 SCCOOS's role in serving as a collaborative regional ocean observing system for the Southern California ocean resource community was further solidified and recognized through the development and adoption of Bylaws by the Board of Governors, the creation of a Senior Advisory Council, meaningful stakeholder growth, broad public and educational outreach and communications, regular engagement with the National Federal of Regional Associations (NFRA) and our state and federal partners, and continued involvement with federal data integration activities.

SCCOOS met the stated Year Two objectives of developing organizational capacity to meet operational needs of data users and formalizing an organizational structure. Highlights of regional association governance, stakeholder and end-user development, and outreach activities during the reporting period include:

- Participation in the California Ocean Protection Council meeting held at Scripps Institution of Oceanography in September 2005
- Conducting a Data Providers and User Groups Working Meeting in October 2005 focusing on monitoring activities and data products and attended by stakeholders from the marine and coastal communities, state and local governments, and coastal resource organizations.
- Conducting a SCCOOS Board of Governors Planning Meeting at UCLA's Institute of the Environment in February 2006 and approval of SCCOOS Bylaws, Strategic Business Plan outline, and creation of Senior Advisory Committee
- SCCOOS participation in the National Federation of Regional Associations (NFRA) Spring Meeting in Washington, D.C., in March 2006
- Sponsorship and implementation of the Southern California Marine Monitoring Conference IV in April 2006
- Expansion of educational outreach program with the Ocean Institute, *Water and Weather*, a 5th grade science curriculum program, to 117 school districts in Orange County using real-time data through SCCOOS

SCCOOS has been successful in building capacity and partnerships among existing regional entities and agency end-users and in encouraging and facilitating collaboration among data providers and data users, a demonstration of the effectiveness of its organizational framework. This framework supports the management and operations of multi-institution partnering activities that are developing the components of the regional observing system.

SCCOOS initiatives in place by the end of the reporting year include:

- integration of state water quality data associated with EPA NPDES permitting and State mandated AB411 monitoring;
- coordination with fisheries monitoring by CALCOFI;
- collaboration with the Tijuana NERR;
- coordination of ocean wave and beach sediment monitoring by the Army Corp of Engineers and California Dept. of Boating and Waterways sponsored CDIP program;
- integration of the manual Shore Station program dating back to 1916;
- coordination with the LA County Watch the Water program;
- implemention of the State Coastal Conservancy's Coastal Ocean Currents Monitoring Program, the California Clean Beaches Initiative, and the NOAA Coastal Observing Technology System (COTS) program.

SCCOOS has responded to these and other state and federal initiatives to provide policy makers and managers with a better scientific basis to evaluate and design new management strategies and to manage risks associated with the coastal environment.

2.0 INTRODUCTION

This report describes progress made during the reporting period toward the development of the Southern California Coastal Ocean Observing System Regional Association. SCCOOS is the regional coastal ocean observing system (RCOOS) being developed and implemented by the Regional Association, one of eleven regional ocean observing systems in the U.S. Integrated Ocean Observing System (IOOS).

SCCOOS is a multi-disciplinary, collaborative regional ocean observing system that incorporates existing observational programs, adds new infrastructure and tools, and provides these observations in synthesized products available to a broad spectrum of users. The system is establishing long-term coastal observations to provide information necessary to address issues in climate change, coastal water quality, marine life resources, coastal hazards, maritime operations, ecosystem management, and national security.

As a science-based decision support system, SCCOOS works interactively with local, state and federal agencies, resource managers, policy makers, educators, industry, scientists and the general public to provide data, models, and products that advance our delivery and understanding of coastal observations and improve the management of the California coastal ocean environment

The SCCOOS governance framework consists of management and operations through a regional consortium of Southern California institutions, generation of end-user services and products through the engagement of an extensive network of stakeholders and interagency partnerships, and provision of policy guidance and expertise through an advisory committee to ensure that the system infrastructure and activities are relevant to the broader goals of state and federal initiatives.

Principal support for SCCOOS is being provided through a) NOAA/Coastal Services Center's (CSC) regional association development grant, for which this report is submitted; b) NOAA's pilot program, Coastal Ocean Technology Systems (COTS); and,

c) the State of California Coastal Conservancy's Coastal Ocean Currents Monitoring Program (COCMP). Several local, state, and federal agencies and private interests provide additional funds and in-kind funding for focus projects and system development. SCCOOS leverages current infrastructure, partnerships, and resources that in 2005 yielded $6.5 million of in-kind support.

2.1 BACKGROUND ON DEVELOPMENT OF THE REGIONAL ASSOCIATION

In the fall of 2002, the Southern California Coastal Ocean Observing System began the initial design and development of a stakeholder-driven organizational development strategy to enhance and promote the organization, implementation, and application of a regional coastal ocean observing system in Southern California. Initial regional coordination funds administered by NOAA have been enhanced by an investment of significant State and local funds. The goals of these efforts have been to:

- actively engage the participation of end-users in the development of new data products, services, and partnering opportunities, including the engagement of market sectors which may be unique to Southern California;
- create a sensible governance structure that is consistent with the strategic business plan and meets criteria for certifying the regional association;
- develop a viable strategic business plan for the regional observation system that allows for sustainable operation through the engagement of local, regional, state, and federal partners and delivery of useful products to end users;
- formally engage recognized bodies of regional associations and agency end-users as advisors;
- integrate marine observations acquired by a broad range of data provider user groups.

SCCOOS is formed by a consortium of twelve institutions and organizations from Southern California and northern Baja, Mexico that serves the Southern California Bight, from Point Conception in the north to just past San Diego in the south, and extending offshore to the Channel Islands. Stakeholders, identified at the onset of this program, participated in the development of integrated goals of SCCOOS and IOOS, with a particular focus on identifying short- and long-term SCCOOS user needs.

Notable progress has been made in the first two years in establishing stakeholder involvement of the sanitation districts, local monitoring networks, resource managers, and the maritime community that are interested in either incorporating their data into the SCCOOS data management system, or in having SCCOOS develop data products for their use. SCCOOS has become a recognized organization among State legislators, State appointed environmental working groups and councils, and local interest groups and non-governmental organizations working to improve coastal conditions.

3.0 REGIONAL ASSOCIATION DEVELOPMENT ACTIVITIES

SCCOOS has actively been involved in organizing activities for developing and formalizing Southern California's regional ocean observing association. Efforts have focused on securing the participation of data users, raising stakeholders' familiarity with

SCCOOS, applying diverse set of stakeholder interests, communicating the goals of IOOS to stakeholders and partners, integrating SCCOOS with existing and similar programs, developing regionally-supported programs, and further developing the day-to-day operations of the organization.

The following activities undertaken in Year Two of the program represent efforts toward the growth and development of the SCCOOS Regional Association and furthering the SCCOOS mission. These activities include developing the SCCOOS governance, organizational, and management structures, preparing a Strategic Business Plan, identifying and engaging stakeholders and end-users, and improving data management and communications.

3.1 Establishing governance and management structures

3.1.1 RA governance structure

The governance structure of the Regional Association was further developed and defined in the reporting period. The SCCOOS governance structure, consisting of the Board of Governors (BOG or Board), the Executive Steering Committee (ESC), and the Board Executive Committee (BEC), operated effectively and responded to governance, planning, operations, and funding matters during the year. As previously reported, the BOG, comprised of senior representatives of the consortium signatory institutions, makes overall decisions concerning the RA based on findings and counsel from the four-member BEC and five-member ESC.

While the BOG effectively serves the role for general voice and operation of the consortium's management, the BEC and ESC were established to provide operational oversight, assist with project and system development, long-range planning, and an organized interface with local, state, federal and industry stakeholders, partners, and funding organizations. (A list of governance structure members is provided in Appendix A.) The BEC met during the year to address government relations and governance strategies. The ESC met to discuss program funding and NOAA's overall IOOS funding, project implementation, and new program development in the context of budget cuts. Figure 1 displays the SCCOOS governance framework.

The SCCOOS Board of Governors conducted a key Planning Meeting on 13-14 February 2006, at University of California, Los Angeles. The meeting was attended by the full Board, ESC and BEC members, representatives of federal, state, and local agency and organizations, and SCCOOS Working Group members and Principal Investigators. The Board considered and took action on organizational Bylaws, a Senior Advisory Committee, a Strategic Business Plan outline, coordination of external communications, working group reports, and updates from SCCOOS programs and state and federal agencies. Meeting materials are available in Appendix B. A selection of presentations made at the meeting is available at http://www.sccoos.org/as-org-meetings.html.

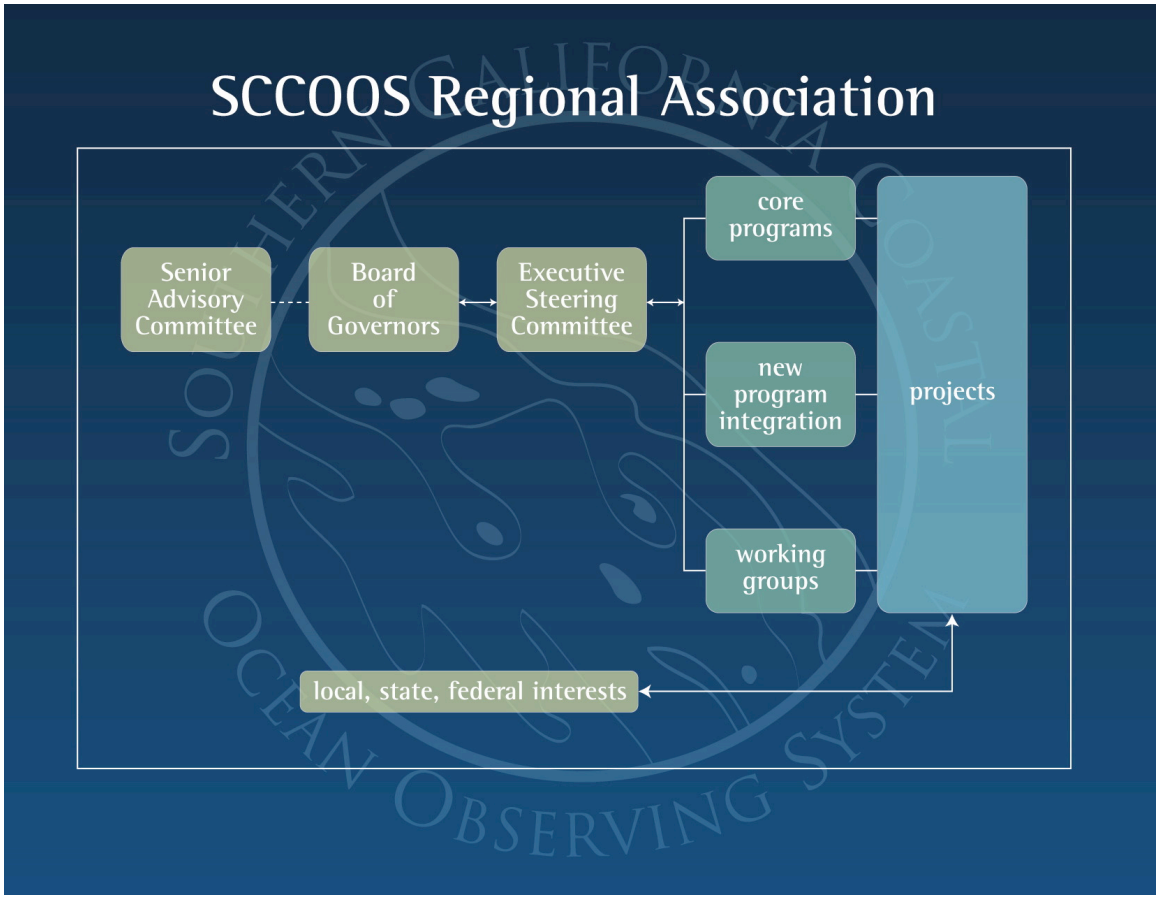


Figure 1. SCCOOS Governance Structure

A significant mark of SCCOOS's development was the unanimous approval by the Board of Bylaws by the BOG at this meeting. As a project-based organization operating under a system of contracts and grants, the Bylaws define the functional relationships of structural components of the SCCOOS Regional Association. The Bylaws address the conduct and function of the Board of Governors, Board Executive Committee, the Executive Steering Committee, the Senior Advisory Committee, Strategic Business Plan, and new Program Integration. A copy of the Bylaws is provided in Appendix C.

Another major step taken by the Board at its meeting was the creation of a Senior Advisory Committee, representing another important milestone in SCCOOS's maturity. The Senior Advisory Committee comprises representatives of eighteen local, state and federal agencies and industry, nominated by the ESC and approved by the Board. The SAC provides the BOG and ESC with insight and perspective on technical, market, legislative, and political matters affecting SCCOOS, provides guidance to existing SCCOOS operations and participates in strategic planning efforts, and serves as an external source of information and reference that links SCCOOS with broad stakeholder interests and knowledge within the region.

The SAC enables state and federal entities to participate and provide input to SCCOOS development without perceived or real conflicts of interest that arise from

funding grantor and grantee situations. The following agencies and organizations have agreed to serve on to the SAC:

- California Oil Spill Prevention and Response
- California Sea Grant Program
- Central Bight Water Quality Working Group
- Marine Exchange of Southern California
- Minerals Management Services
- National Oceanic and Atmospheric Administration (NOAA)
- NOAA Southwest Fisheries/PacOOS
- Orange County, Health Care Agency
- SoCal Stormwater Monitoring Coalition
- State Coastal Commission
- State Coastal Conservancy
- State Water Resources Control Board
- Tijuana River National Estuarine Research Reserve
- US Army Corps of Engineers
- US Coast Guard
- US Geological Survey
- USC Sea Grant Program
- US Naval Meteorology and Oceanography (METOC)

A complete list of SAC organizations and representatives is provided in Appendix A.

SCCOOS's efficient governance structure has been developed to foster cohesion of regional stakeholder needs and promote a unified system at both the regional and national levels. SCCOOS governance is designed to involve key decision-makers of different disciplines and participating entities so that data providers and users are instrumental in the design, operation and improvement of the product development and dissemination.

3.1.2 RA administrative and fiscal structure

SCCOOS has developed a functional administrative and fiscal structure that permits sound and efficient means for entering into contracts and receiving and distributing funds in a manner than promotes institutional exchange of ideas. Administered by the Joint Institution of Marine Observations (JIMO), a collaborative of the University of California, San Diego, and NOAA, SCCOOS has managed approximately $12M in awards since its inception. Through JIMO and progressive collaboration with NOAA, SCCOOS operates as a system of contractual agreements and partnerships between the institutions implementing components of the regional ocean observing system. SCCOOS has experienced a number of advantages in having contractual relationships between the participants and members including: a) responsibilities and entitlements of participants are carefully laid out in work orders and proposals; b) liabilities can be imparted or limited openly and by mutual agreement; and c) individual participant business needs specific to the affiliated organization can be accommodated.

JIMO, operated by the Marine Physical Laboratory Department at Scripps

Institution of Oceanography, UC San Diego, is the lead business office for SCCOOS, and has demonstrated capability to handle all business activities for SCCOOS, including the issuance of subawards and subcontracts, invoicing, and reporting for complex and large programs. More than a dozen contractual arrangements between consortium members have been established for ensuring the smooth operations of the SCCOOS consortium. For additional information about JIMO and its capabilities, see http://jimo.ucsd.edu/overview/about_us.html.

Principal funding for SCCOOS was provided by NOAA's pilot program, Coastal Observations Technology System (COTS), which establishes the initial means for data collection for a range of disciplines aligned with the seven initial societal goals of the U.S. Integrated Ocean Observing System (IOOS). In addition, the State of California, through Propositions 40 and 50, is investing in infrastructure through the Coastal Ocean Currents Monitoring Program (COCMP), a program focused on the measurement and modeling of coastal circulation. A significant portion of resources from COCMP is directed toward a statewide HF radar array. The RA development grant is both timely and complementary to these programs, providing an opportunity to ensure coordination of these investments with the planning efforts of IOOS and examine avenues for long term, sustained operational support.

3.1.3 RA management structure

SCCOOS operations are implemented under a system of contracts, and Dr. Eric Terrill serves as SCCOOS Chief Operations Officer (COO). Dr. Terrill manages and oversees the operational aspects of developing the ocean observing system, the creation of data management systems and development of data products, interfaces with the governing bodies and partner institutions, and engages with key stakeholders and interests group. He is supported by technical staff resident in the Coastal Observing R&D Center at Scripps Institution of Oceanography.

SCCOOS experienced a staff change during the reporting period. Following the departure of the previous part-time Organization and Administration Coordinator, Stephanie Peck was hired into the position of Manager, Administration and Policy, reflecting the need noted last year to transition to and support a position at a higher, full-time level. Ms. Peck manages governance, organizational, policy, and administrative duties associated with operating SCCOOS, while taking on an increased role in outreach and communications. Carolyn Keen, who has served as the part-time Outreach and Communications Coordinator, continues to assist with outreach and communications.

Technical Working Groups have continued to provide input and guidance into the development of the regional observing system components. The following working groups provided updates to the Board of Governors at its meeting in February 2006:

- Ocean and Atmospheric Modeling
- Ocean Moorings
- Educational Outreach
- Nearshore
- HF Radar Surface Current Mapping
- Remote Sensing

Working group presentations are available for viewing at www.sccoos.org.

3.2 Strategic Business Plan

SCCOOS staff continued work on a draft Strategic Business Plan during the reporting period. The Board of Governors, at its February 2006 meeting, approved the business plan outline and discussed further progress on the plan in the context of draft guidance issued by Ocean.US in August 2004. The draft Strategic Business Plan describes goals and objectives, market analysis and regional needs in Southern California, funding of SCCOOS components, the system's operating procedures, performance measures, and customer development.

In August 2005, SCCOOS received a grant from the Resources Legacy Fund Foundation to support development of its business plan. Through this grant, SCCOOS is working with CeNCOOS to prepare a business plan that will represent a common statewide approach to development of the two regional observing systems while still reflecting the distinct business needs and capabilities of the respective regions. SCCOOS and CeNCOOS staff dedicated time during the year to work collaboratively on the business plan to craft a workable template that could then be tailored for each RA.

3.3 Stakeholder Development and Outreach Efforts

Considerable outreach was conducted during the year to stakeholders and end-users and with the ocean observing community at the regional, state and federal levels. As a result of these efforts, SCCOOS witnessed a heightened awareness about the regional association and regional observing system, received many requests for meeting participation and presentations, and experienced an increase in requests for data exchange, data integration and data products.

Table 1, at the end of this section, displays SCCOOS outreach efforts that took place during 2005-06 in the areas of stakeholder and end-user development, communications, and educational outreach.

3.3.1 Identifying and engaging stakeholders

SCCOOS continued its work to identify and engage stakeholders in Southern California as collaborators, data providers, and data users. Potential stakeholders are those agencies and organizations involved with mission-driven data collection or are in need of ocean observations and monitoring information that would participate in data exchange and data provision to make available for decision-makers, interested parties, and the public. SCCOOS works with stakeholders to integrate their data and develop data products that meet local and regional needs for decision support tools and information.

A primary focus of outreach has been on developing a regional network of issue-driven data user and data provider working groups in the areas of water quality, coastal hazards, coastal ecology, marine resources, and marine safety. These groups help SCCOOS to identify and understand management needs and to build on existing collaborations. They also serve as cornerstones for the two-way communication of

information and articulation of the benefits derived from enhanced coastal observations and data integration. The engagement of these coastal and marine communities facilitates the assimilation and integration of their data into the SCCOOS data system and helps to ensure the meaningful use of data products generated by SCCOOS.

In October 2005, SCCOOS convened a Working Meeting of data providers and data users at the Headwaters to Oceans Conference to seek input about and develop recommendations about regional observation and monitoring data needs in the areas of water quality, marine life resources, and coastal hazards. The response from participants was excellent and was used as input to strategic planning efforts. From this meeting came directed feedback about SCCOOS data products, data management and integration needs, and monitoring needs. Meeting notes and the attendees list are available in Appendix F.

In the fall 2005, SCCOOS administered a users survey designed to help identify end users and data providers who are willing to work with SCCOOS to either develop data products or incorporate existing data into the SCCOOS data management system. The responses received were used in identifying data needs, enhancing access to and availability of data on the SCCOOS web site, and initiating contact with respondents interested in working with SCCOOS on data sharing.

SCCOOS sponsored and participated in the conduct of the Southern California Marine Monitoring Conference IV, held at the Aquarium of the Pacific in April 2006. Other sponsors of the event were the Aquarium of the Pacific's Marine Conservation Research Institute, USC's Wrigley Institute for Environmental Studies, and Catalina Conservancy Divers. This conference, focused on marine monitoring efforts in Southern California, brought together data managers, data users and providers, and coastal resource representatives to learn about ongoing marine monitoring activities, foster collaboration in data exchange, discuss data integration, and explore opportunities to make data available to a broader user community through SCOOS. Information about this conference is provided in Appendix G.

The California Coastal Coalition (CalCoast) continued its assistance this year in developing end-user outreach and facilitating communication with various groups within the coastal community. SCCOOS staff worked with CalCoast to identify specific coastal community entities for SCCOOS outreach activities. CalCoast advocates coastal interests, brings coastal cities, counties and organizations together, and serves as a clearinghouse for information about studies and projects along the California coast. The organization is a non-profit advocacy group comprised of 35 coastal cities, five counties, and four regional governance organizations: Association of Monterey Bay Area Governments (AMBAG), Beach Erosion Authority for Clean Oceans and Nourishment (BEACON), San Diego Association of Governments (SANDAG), and Southern California Association of Governments (SCAG).

CalCoast membership also includes coastal consultants, business associations, and allied groups committed to restoring California's shoreline and watersheds through sand replenishment, increasing the flow of natural sediment, wetlands recovery, and improved water quality. CalCoast is a member of the Public Advisory Committee of the Southern California Wetlands Recovery Project (WRP), and the local government representative

on the Coastal Sediment Management Workgroup (CSMW), formed in 2000 by the California Resources Agency and the U.S. Army Corps of Engineers.

Outreach activities with different groups have resulted in considerable interest, support, and participation in SCCOOS products and applications. Engagement with stakeholders has resulted in detailed discussions on the data management capacity of SCCOOS and the interest of many organizations to have their data integrated. We are working with public environmental health managers from six agencies in coastal water quality data activities, including integration of their data with regional observing system data, the usage of SCCOOS data in their permit reports, and mandates to work with SCCOOS in their five-year EPA/NPDES permits. Wastewater and storm water permit holders have indicated a willingness to begin examining new methods of monitoring that would provide greater benefit to SCCOOS and to the community at large. Water quality managers in the region are adapting their beach management practices and decision-making in based upon iterative product development efforts that focus on predicting beach water quality.

SCCOOS has been successful in supplying products developed by the collaboration of SCCOOS partners and stakeholders input. For an overview of current data products available on the SCCOOS website, see Appendix E**.**

3.3.2 Outreach and communication activities

SCCOOS staff, partners, and PIs have engaged in extensive outreach activities this year including regular communications, networking, and participation in meetings, workshops, and conferences. SCCOOS has continued to disseminate information about the system, technologies employed, and data products and applications through the development, creation, and distribution of collaborative materials, brochures, and briefing papers. See Appendix H for examples of these publications.

A significant vehicle for communication is the SCCOOS website, www.sccoos.org. The web site has continued to evolve considerably this past year and includes links to existing observational data from a dropdown box on the map on the homepage, SCCOOS news and events, a calendar, governance and organization information, SCCOOS documents (proposals, reports, outreach materials), related agency information, current data products, the SCCOOS survey, information on and minutes from past meetings, and projects underway. The website has served as an excellent means for SCCOOS to disseminate and exchange data.

To ensure that all participants and members are aware of SCCOOS news and events, a regular publication, SCCOOS News, is distributed electronically, which lists all events and other items published on the website since the last newsletter, as well as upcoming funding opportunities. An example of an issue of SCCOOS News is provided in Appendix I.

An attribute of Southern California is the large number of organized coastal constituents who have a diverse, and potentially conflicting, set of needs from an observing system. SCCOOS has been proactive in engaging users by the identification of user needs for the delivery and management of data services and data products, yet conservative in defining a broad organizational structure that may introduce conflict of

interests between the implementation of the observing system and its regional financial support, which will be necessary for sustained operations.

3.3.3 Educational outreach

Numerous published reports including *Promoting Lifelong Ocean Education: Using IOOS to Shape Tomorrow's Earth Stewards and the Science and Technology Work Force* (Ocean.US, pub. No. 4) and *NOAA's Educational Policy* conclude that emerging educational response plans to the developing IOOS system must be based upon integrating science into high-quality educational materials, improving access to scientific resources, and supporting teacher professional development. SCCOOS educational outreach efforts have focused on establishing a foundation in each of these three areas by combining the expertise of SCCOOS scientists, the data and resources available through SCCOOS and the pedagogical expertise of educators at the Ocean Institute in Dana Point, California, the Scripps Institution of Oceanography's (SIO) Birch Aquarium, and EarthGuide, SIO's site for web-based educational resources.

SCCOOS has partnered with the Ocean Institute since 2004 to develop a comprehensive educational outreach program for teachers and students, being piloted in Orange County, California. The program's three primary components are:

a) Teacher Professional Development – a one-day workshop and field cruise for teachers showcasing SCCOOS scientists, equipment, protocols and products;

b) Weather and Water Field Explorations for Students – field trip to OI where students visit a working CDIP buoy and, conduct solar, CTD and sea-surface measurements and correlate buoy reading with real-time observations;

c) *Weather and Water* Classroom Curriculum – continued development of a comprehensive nine-week Weather and Water Curriculum and Science Kit that utilizes SCCOOS products to support 5th grade science assessments and meet California 5th grade Earth Science standards on the water cycle and weather.

The project addresses a primary NOAA goal of "promoting environmental literacy by increasing understanding and use of NOAA data, information and programs". Objectives of the educational program are to foster improvement in standardized test scores and model best practices for science instruction. Curriculum development for this program is taking place over a three-year period and includes teacher focus groups and training sessions in order to develop a program that effectively helps prepare students for California science standards and rigorous new assessments.

Efforts in this second year focused on continued development, testing, and delivery of the comprehensive nine-week curriculum. During the 2005-2006 school year the program was delivered to and is now being used in 17 school districts throughout Orange County. The project has been refunded for the 2006-2007 school year where mechanisms will be tested for sustainability and increased dissemination. The program eventually will reach over 15,000 5th grade students.

The curriculum includes development of and access to a new SCCOOS Education and Outreach web Site that adapts NOAA ocean and weather data products into student-friendly activities that are embedded into the curriculum. (See http://sccoos.org/commclass.html). The curriculum carefully integrates the new Web site

into creative school-based activities allowing students, for example, to use real-time SCCOOS sensor data to study differential heating and development of coastal sea breezes in real time.

In 2005-06, SCCOOS provided $62,000 through COTS funds to the Ocean Institute for *Weather and Water* program development and $10,000 to Birch Aquarium at Scripps (COSEE CA) for educational outreach coordination and dissemination of the *Weather and Water* program. The SCCOOS-funded work served as a catalyst for attracting additional funding from the Arnold and Mabel Beckman Foundation ($325,000 matching funds).

The Ocean Institute in Dana Point, a SCCOOS partners, is a non-profit ocean education center that hosts over 90,000 K-12 students per year through 60 field science courses aboard the vessel R/V Sea Explorer, in the new 33,000 sq. ft. Ocean Education Center, in the Dana Pt. Marine Life Refuge, at Catalina Island and with the Ocean in Motion traveling classroom. California COSEE is dedicated to fostering collaborations among ocean scientists and K-12 educators. The Center marshals the considerable resources several institutions, including Scripps Institution of Oceanography (SIO), University of California, San Diego. These organizations have launched a strategic campaign to integrate ocean education and research with the goal of enhancing the general public's understanding and appreciation of the ocean.

3.3.4 Engagement with state and federal ocean community

SCCOOS continued to participate in state ocean observing development and federal IOOS and NFRA activities this year. The COCMP Annual Review Meeting was held in November 2005, providing the State Coastal Conservancy, SCCOOS and CeNCOOS with an opportunity to review and discuss the progress of the Regional Associations' implementation of the state's currents monitoring program. COCMP plays a significant role in leveraging federal support for the development of the Southern California regional observing system. SCCOOS is recognized by the state as the Regional Association building that system. SCCOOS reviewed and provided feedback about the creation of the state's ocean observing program and on the Ocean Protection Council's five-year Strategic Plan. In establishing the program, Ocean Sciences Applications (OSA), the California Ocean Protection Council confirmed from its staff that the Regional Associations had been consulted and provided input.

SCCOOS participated regularly with NFRA matters and meetings. Staff participated on a committee that reviewed and provided comment and recommendations on draft RA certification criteria. SCCOOS also participated in the development of NFRA Bylaws throughout the spring of 2006. SCCOOS attended and gave a presentation at the NFRA Spring Meeting held in 7-8 March 2007 in Washington, D.C., and participated in monthly Regional Association conference calls.

SCCOOS staff participated in IOOS planning activities including providing input, through NFRA, of IOOS development, Regional Association certification criteria, and federal funding. SCCOOS and SIO helped to coordinate support by the California legislative delegation for IOOS as part of a letter sent to the Senate Appropriations Committee in March 2006 that was signed by 17 U.S. Senators.

Table 1. SCCOOS Regional Association Development 2005-2006 Outreach Activities

Communications			
Date	Activity	Purpose	SCCOOS partners and participants
ongoing	SCCOOS web site (www.sccoos.org)	To inform stakeholders and the public about SCCOOS governance, observing system components, and education and outreach and to maintain and provide access to data and data products.	SCCOOS staff
ongoing	Development and distribution of electronic SCCOOS News	To keep SCCOOS Board, Senior Advisory Committee, PIs, and stakeholders informed of SCCOOS and regional ocean and coastal-related news.	Distributed to local, regional, state and federal partners, organizations, industry representatives.
ongoing	SCCOOS has been the subject of or included in various articles in different print media.	Information in articles regarding SCCOOS activities, role in water quality monitoring data, and operations.	Heal the Bay, San Diego Regional Water Quality Control Board.
2/1/06 & 3/2/06	Reports on Harmful Algal Bloom events were published on the SCCOOS webpage.	Inform the public HAB events detected during the monitoring project.	SCCOOS PI Lilian Busse
Spring 2006	Article in Explorations Magazine, Vol. 12, No. 4, Spring 2006: Voyager: Welcome to Plankton Planet, p. 28-35	Harmful Algal Bloom Monitoring Program is referenced in the article.	SCCOOS PI Lilian Busse
Stakeholder & End-User Development			
Date	Activity	Purpose	SCCOOS partners and participants
7/7/05	Clean Water Summit, San Diego; SCCOOS representatives attended and provided handouts.	To discuss San Diego watershed protection progress, watershed protection approaches, solutions to water quality issues, and a proposed Statewide General Industrial NPDES permit that would change industry regulations.	County of San Diego, San Diego Regional Water Quality Board
7/11/05	Workshop at the San Diego National Weather Service Office. SIO gave presentations on the development of SCCOOS, funded data gathering activities, and the role of CDIP in modeling, observing, and forecasting ocean waves in Southern California.	Meeting focused on enabling an open exchange of knowledge and data between the various participants and coordinating the communication of priorities for the Integrated Ocean Observing System (IOOS) in Southern California; SCCOOS will be integrating data from the Weather Offices for access from the SCCOOS website.	National Weather Service, San Diego office, Navy Pacific Meteorology and Oceanography Center
7/12/06	Costal Conservancy staff visit for one day meeting with SCCOOS Pis, Eric Terrill, Lisa Hazard.	Visit SCCOOS and provide briefing on COCMP/SCCOOS.	California Coastal Conservancy staff Sam Schuchat and Sheila Semans
7/22/06	California Oceans Regional Meeting and California Ocean and Coastal Economic Summit, held by the California Biodiversity Council in Long Beach.	The meeting focused on progress of the Southern California Wetlands Recovery Project, as well as recent California ocean economy studies sponsored by the National Ocean Economics Program.	Southern California Wetlands Recovery Project, UCLA, California Biodiversity Council
7/05 & 8/05	SCCOOS met with the Santa Monica Bay Restoration Commission.	To discuss collaboration with the Commission's Technical Advisory Committee and pelagic/water quality work plan.	SMB Restoration Commission, UCSB, UCLA
8/3/05	The Wave of the Future: Shoreline Preservation Technologies and Strategies Board Conference, hosted by San Diego County, SANDAG, CalCoast, San Diego, CA	SCCOOS exhibit	Carolyn Keen, Debbie Duckworth
8/8/05	Perspectives on Ocean Science Presentation Series 2005: Southern California Coastal Ocean Observing System, at Birch Aquarium at Scripps, La Jolla, CA	Presentation on SCCOOS	Eric Terrill, SCCOOS staff
8/24/05	Marine Metadata Interoperability Project Workshop, Boulder, CO	Staff led SCCOOS and NOAA work on metadata for waves and currents	Julie Thomas, Jerry Wanetick, Mark Otero
8/24/05	Meeting and tour at SCCOOS, for California Department of Boating and Waterways (CDBW) and California Resource Agency staff.	David Pierce and Robert Guza (SIO) presented SCCOOS to the group, followed by a tour of the Coastal Data Information Program (CDIP) facility.	CA Department of Boating and Waterways, California Resource Agency
8/27/05	Participation in the The Wrigley Marine Science Center 40th anniversary, Catalina Island, and 10th anniversary of USC's Wrigley Institute of Environmental Sciences.	USC manned a SCCOOS booth, which attracted many visitors and provided an opportunity to individually discuss SCCOOS efforts.	Burt Jones and Matthew Ragan of USC, USC Wrigley Institute of Environmental Sciences
9/17/05	SCCOOS SIO researcher Lilian Busse presented to the Torrey Pines Docents Meeting.	Talk on Harmful Algal Bloom in local waters.	Representatives of marine life community
10/2-10/7/05	3rd US Harmful Algal Bloom Conference	Poster: Did we have toxic algal blooms in California in the past? – Some insights from historical data.	Lilian. Busse, Elizabeth Venrick, K. Damil
10/2-10/7/05	3rd US Harmful Algal Bloom Conference	Poster: Toxic Pseudo-nitzschia: What's in a number?	Elizabeth Venrick
10/10-10/12/05	American Shore and Beach Preservation Association Annual Conference, San Francisco, CA	SCCOOS co-sponsor; SCCOOS exhibit	H. Celico, Debbie Duckworth, D. Castel and Julie Thomas

10/13/05	Legislative Assistant visit to SIO	Visit to Scripps Institution of Oceanography, briefing on CDIP/SCPB and SCCOOS.	Greg Parks, Eric Terrill, Bob Guza
10/24-10/26/05	OOSTech 2005: Web Services for Interoperable Ocean Science, Baltimore, MD	SCCOOS programmers participated in technology conference focused on web services for ocean science research and observations.	Paul Reuter, Jen Bowen, Jerry Wanetick
10/26-10/28/05	2005 Headwaters to Oceans Conference, Long Beach, CA	Presentation: Seasonality and trends of Southern California algal blooms	Melissa. Carter, John McGowan, Lilian Busse, Frank Mazzillo, Eric Terrill, Reinhard Flick
10/27/05	Data Providers and Users Group Meeting, Huntington Beach	Provide overview of SCCOOS and moderated discussion on optimal monitoring activities and data products	30 stakeholders from marine and coastal industries, state and local government, and coastal resource organizations
11/2-11/4/05	QARTOD III Workshop held at SIO with key data providers to the SCCOOS data system	Co-hosted by SCCOOS; addressed QC for CTDs, in-situ currents, remote currents and waves.	Data providers, local municipal agencies, SCCOOS staff
11/12/05	12th Explorations in Marine and Ocean Sciences (EMOS), Outreach program, Birch Aquarium, La Jolla, CA	Presentation: Plankton at the Pier	Lilian Busse
12/8/05	Presentation to City of Oceanside Beach and Harbor Advisory Committee.	Julie Thomas made presentation on SCCOOS instrumentation location and types, and CDIP/SCBPS projects that affect Oceanside mariners and coastal zone management. As one of CDIP's wave monitoring buoys is located 4 miles west of Oceanside, the wave data is critical to local boating operations.	City of Oceanside Harbor
1/11/06	Workshop on Hazard Locator Tool (HLT), NOAA Coastal Services Center, San Diego, CA	SCCOOS staff participated in workshop on user tool development and use.	Delores Wesson, Eric Terrill
1/19/06	SCCOOS briefed Katie Whelan, Special Advisor to Governor Arnold Schwarzenegger, and Carolyn Henrich, Legislative Director for Education at UCOP's Office of Federal Government Relations	Discuss the State and Federal partnerships that support the development of ocean observing activities in the State.	State of California, UC Office of the President
1/23-1/25/06	Public Health Risks: Coastal Observations for Decision Making, sponsored by JOSS, St. Petersburg, FL	Presentation: Ecosystem-based Management of Public Health Risks	Eric Terrill
1/23-1/28/06	The Third Global Conference on Oceans, Coasts, and Islands, UNESCO Paris, France	Presentation on SCCOOS	Delores Wesson
2/13-2/14/06	SCOOOS Board of Governors Annual Meeting, Los Angeles, CA	Updates provided on SCCOOS integrated programs and work groups reports	SCCOOS Board of Governors, SCOOOS staff, COTS PIs
2/15/06	SCCWRP Beach Water Quality Workgroup meeting, attended by Eric Terrill.	Discuss collaboration between SCCOOS projects and SCCWRP.	Southern California Coastal Water Research Project, Beach Water Quality Workgroup
2/20 - 2/24/06	2006 AGU Ocean Sciences Conference, Honolulu, Hawaii	Numerous presentations on SCCOOS, SCCOOS integrated programs	Eric Terrill, Julie Thomas, Robert Guza, other SCCOOS partners
2/28/06	SIO Workshop: Protecting California's Ocean, La Jolla, CA	Participation in discussion, provision of information about SCCOOS	SCCOOS staff
3/9-3/10/06	Workshop on data sharing, translation and QA/QC of ocean currents and ocean temperature. Hosted by SECOORA and SEACOOS, Chapel Hill, NC	SCCOOS provided input and participated in discussion about data integration and QA/QC standards development.	Paul Reuter, Jen Bowen
3/9-3/10/06	National Federation of Regional Associations (NFRA) Annual Meeting, Washington, D.C.	Participation in NFRA Board meeting; presentation on SCCOOS water quality data retrieval system	Stephanie Peck, Chris Cohen (SIO), NFRA, RA representatives, NOAA staff
4/24-4/25/06	Southern California Marine Monitoring Conference, Long Beach, CA	SCCOOS co-sponsor; various SCCOOS presentations	SCCOOS: Eric Terrill, Stephanie Peck, Lisa Hazard, Paul Reuter, Jen Bowen, Karen Baker, Jerry Wanetick, Julie Thomas; partners: Aquarium of the Pacific, the Wrigley Institute for Environmental Studies, Catalina Conservancy Divers
5/25/06	Presentation by Bob Guza to Orange County Coastal Coalition.	Talk on HB 06 demonstration: Southern California Beach Process Study.	Representatives of Orange County Board of Supervisors and Health Care Agency, Orange county Sanitation District, Surfriders, other coastal parties.
6/7/06	Presentation by Bob Guza to San Diego chapter of American Meteorological Society.	Talk on Coastal Data and Information Program (CDIP) and Southern California Beach Process Study.	Representatives of climate and meteorological interests.

6/19-6/20/06	IOOS Regional Catalog Workshop, Woods Hole, MA	Work with Regional Association and NOAA representatives on development of initial data catalog	Lisa Hazard
6/21-6/23/06	QARTOD IV Workshop, Woods Hole, MA	Worked with other data managers and users on SCCOOS's implementation of QARTOD.	Julie Thomas, Jerry Wanetick, S. Diggs
6/30/06	Clean Water Summit, San Diego, attended by Stephanie Peck	Forum on San Diego County Integrated Water Management Plan and water quality issues	County of San Diego, San Diego Regional Water Quality Board
ongoing	Attendance by Stephanie Peck at monthly meetings of the Orange County Coastal Coalition	Keep abreast of coastal and ocean observing related issues in Orange County	Orange County Sanitation District, County of Orange Health Care Agency, CalCoast
ongoing	Attendance by Julie Thomas at regular meetings of SANDAG Shoreline Preservation Committee.	Stay apprised of and participate in discussion of coastal and beach issues affecting San Diego county coastline	Representatives of City and County of San Diego, coastal cities in San Diego County, and other coastal organizations
ongoing	Participation by Stephanie Peck in monthly conference calls with Regional Associations and Ocean.U.S.	Information exchange and updates on development of Regional Associations and regional ocean observing systems	Regional Associations, NFRA, Ocean.US, NOAA CSC
Educational outreach			
Date	Activity	Purpose	SCCOOS partners and participants
ongoing	Science curriculum development for 5th grade with the Ocean Institute	Integrate SCCOOS data into curriculum designed to meet 5th grade Earth Science standards on the water cycle and weather	The Ocean Institute, CA COSEE
3/25/06	The Coastal Data Information Program (CDIP) dedicated a web display program to the Ocean Institute in Dana Point, CA.	Exhibit, which includes an actual wave buoy, accesses data from the CDIP buoy deployed approximately 4 miles west of Dana Point. The exhibit will be used as an educational tool to further understanding of the principals of physical oceanography	The Ocean Institute, CDIP

3.4 DMAC

SCCOOS staff has been regularly involved with IOOS DMAC efforts. SCCOOS staff participated in meetings and workshops during the year with other members of the IOOS DMAC community. Highlights of this participation include:

- SCCOOS participated in the IOOS Regional Catalog Workshop on 19-20 June 2006 at Woods Hole, MA, in which RA and NOAA representatives worked on developed of an initial data catalog.
- SCCOOS staff attended the SECOORA/SEACOOS Workshop held 3-10 March 2006, in Chapel Hill, North Carolina, on data sharing, translation and QA/QC of ocean currents and ocean temperature.
- SCCOOS participated in the Quality Assurance of Real-time Data (QARTOD) III Workshop, November 2005, held at Scripps Institution of Oceanography, and in QARTOD IV Workshop, held 21-23 June 2006 in Woods Hole, MA. These workshops are an IOOS community effort to address the challenges related to the description and distribution of real-time ocean data. One of the primary challenges facing the ocean community is the fast and accurate assessment of the quality of data streaming from IOOS partners.
- SCCOOS participated in the IOOS Interoperability Demonstration in October 2005, the test bed for addressing three primary DMAC-specific issues: establishing a National Testbed for interoperability; establishing Regional theme oriented demonstrations; and, addressing standards and protocols. From this meeting, the demonstration project went out for peer review.
- SCCOOS participated in the Marine Metadata Interoperability Project Workshop in Boulder, Colorado, in August 2005. The workshop focused on metadata

management and standards design for metadata mapping. Julie Thomas led both SCCOOS and NOAA participants' work on metadata for waves and currents.

In addressing regional DMAC issues while growing our regional observing system, SCCOOS guiding principals are taken from the DMAC plan, which proposes:

- Interoperability
- Open easy access and discovery
- Reliable, sustained, efficient operations
- Effective user feedback
- Open design and standards process
- Preservation of data and products

SCCOOS has built upon work at the San Diego Supercomputer Center and SIO in the development of the Storage Resource Broker (SRB) and the NSF-sponsored Information Technology Research Real time Observatories and Data management Network (ROADNet) project. The SRB is middleware that provides distributed clients with uniform access to diverse storage resources in a heterogeneous computing environment.

SCCOOS data management software for legacy and non-real-time data are currently written in Java and PHP, with the goals of cross-platform support and rapid development. The current data server is centralized for the initial development stages, but most portions of the server will be modular and machine-independent. SCCOOS will also enable access to the real-time software as the California Ocean Current Monitoring Program grows. Several diverse groups are actively participating in the SCCOOS data management process, contributing both near real-time and delayed data from cruises, CTDs, and manual sampling processes. The diversity inherent within these datasets has greatly strengthened the growing SCCOOS data system by helping the project to develop flexible yet thorough metadata standards, and by improving the robustness of the data transport process.

4.0 PLANS FOR THE NEXT YEAR

4.1 Further Stakeholder and Collaborator Development

SCCOOS will continue and expand its stakeholder outreach efforts in the next year to members of the coastal and marine community, including the ports, coastal managers, marine safety, and coastal cities. SCCOOS will work with CalCoast to identify opportunities to meet with and make presentations to groups such as BEACON and other coastal organizations. SCCOOS will continue to meet with regional organizations to introduce them to regional coastal observing efforts and IOOS. Following upon our engagement of the Orange County Coastal Coalition, SCCOOS will identify and meet with San Diego County, Los Angeles County, Santa Barbara County and Ventura County organizations that are similar in scope. Specific stakeholder groups include the oil spill interests of the Operators Group, organized by the Oil Spill and Prevention Response (OSPR) and USCG, industry interests of liquid natural gas (LNG) terminals, security interests of the USN and USCG, and the maritime and port interests in the region.

SCCOOS will be a co-sponsor and important participant in the California and the World Ocean 06 Conference, being held in the Fall 2006 in Long Beach, California.

Participation will include a joint exhibit with CeNCOOS, presentations, and posters. It is anticipated that the inaugural meeting of the Senior Advisory Committee will be held during the conference.

SCCOOS is exploring a partnership with Bateman Productions to network and promote the regional observing system with the Southern California marine safety and lifeguard community. Bateman Productions will assist in convening meetings and raising awareness of the benefits of participation in the regional system and IOOS and may produce a video and promotional materials targeted to these audiences.

SCCOOS will continue to follow up with opportunities for collaboration that developed from the Southern California Marine Monitoring Conference in Long Beach and other meetings with interested stakeholders. SCCOOS has been approached about working with the Rocky Inter-tidal group (MARINe) on a workshop being planned for the fall 2006. As the observational components of SCCOOS mature, preliminary data products will be introduced to these groups for feedback.

4.2 Strategic Business Plan

In the coming year, the draft Strategic Business Plan will be finalized and distributed for a thorough review and discussion within the Senior Advisory Committee, and then to the Board Executive Committee and Executive Steering Committee before being submitted to the Board of Governors for review and approval. The grant to SCCOOS and CeNCOOS from the Resources Legacy Foundation Fund will enable the RAs to secure the services of a business plan consultant for review and recommendations during the review process.

The plan is designed and will be modified with the intention that it meets Ocean.US and NOAA standards for business development and criteria for certification as a component in the IOOS. It is anticipated that the plan will be submitted to the SAC in early 2007 for review and to the BOG for approval in late spring or early summer 2007.

4.3 Educational outreach

Findings from the Ocean Institute *Weather and Water* curriculum program have demonstrated that data products could be useful in formal environments, but only when embedded into a comprehensive curriculum and supported by teacher professional development. The formative and summative evaluation results have shown the program to be successful in Orange County. In order to address the national imperative to improve science and environmental literacy, there is a need to investigate the scalability of successful education programs and to understand the processes by which 'best practices' can be disseminated to broader geographic areas. A proposed *Southern California Weather and Water Dissemination Project* will build capacity by introducing a new model into an extant and successful partnerships between the University of California Santa Barbara's Marine Science Institute (UCSB MSI), NOAA's Channel Islands National Marine Sanctuary (CINMS), Ventura County Office of Education (VCOE) and Santa Barbara County Education Office (SBCEO); partnership between the California Science Center and the adjacent Science Center School; and the Scripps

Institution of Oceanography's Birch Aquarium and San Diego School District. The project invokes a powerful new strategic model for how universities, informal science education centers, public agencies and foundations can partner to improve environmental and scientific literacy.

4.4 Addressing DMAC

As SCCOOS moves forward, it will continue to promote project involvement and transparency through source code repositories, documentation policies, and community responsiveness. Work is currently hosted in a Subversion repository that will be made available to the general public in a read-only format, with write permission available upon request. The development process will incorporate documentation standards such as JavaDoc and PHPDocumentor. Project documentation and data formats will be made available on the SCCOOS interactive website as time progresses.

Much of the development efforts thus far have focused on the data transport and archival processes, quality control, and the creation of FGDC-compliant metadata standards. Future efforts will emphasize delivering data to users through XML and web displays, on further decentralizing and coordinating data servers, and on interfacing with the Storage Resource Broker at the San Diego Supercomputer Center for further data archival and dissemination needs.

- Staff will be providing data management for HF radar nationally.
- SCCOOS is serving as a test bed for the NSF funded ITR project LOOKING (http://lookingtosea.ucsd.edu/), which is tasked with developing an integrated knowledge grid for planned ocean observatories, such as the NSF funded ORION project.
- SCCOOS is in the process of convening a bight-wide data management working group.

5.0 PRIORITIES FOR OBSERVATIONS FROM A REGIONAL PERSPECTIVE

5.1 Priorities for Developing the National Backbone

1. A focused program of autonomous (mooring, glider, AUV, acoustic) sampling arrays should be established to (1) extend the density and coverage of long-term moorings describing synoptic weather variability and routine profiling of ocean properties (temperature, salinity, currents, radiation, optical properties), (2) begin time series of processes (mixing, primary production, particle settling, river inputs, zooplankton growth), and (3) survey benthic and pelagic habitats. This will require national coordination of efforts to extract maximum use from national assets like NDBC moorings, to convert research tools into operational techniques, and to develop products of broad utility.

2. Data assimilating models of the ocean and atmosphere are the most promising way to combine observations from diverse observing systems into a coherent and dynamically consistent picture of the ocean and its ecology as they evolve. Several such data synthesis methods are being developed within regional observing arrays but have not

yet developed to a state where they are useful operational tools. Development of these tools must be accelerated in order to be ready for use generating IOOS products. Various coast-wide applications (the monitoring of the California Current Large Ecosystem, climate impacts, offshore search-and-rescue and spill response) would benefit from assimilating models that cover the west coast from Mexico to Canada and span both physical and lower trophic-level properties and processes.

3. Dealing with near shore problems (pollution dispersion, beach sand management, coastal erosion) depends on observations of sand volumes on the beach and offshore (aerial photography, LIDAR and acoustic surveys), measurements of the waves that force near shore currents, a model that links wave forcing to currents and dispersion in the near shore and extension/coupling of these models to data driven models in the offshore, and observations of these processes with which to validate models. Initially these will be developed on a site-by-site basis, but a national effort will be needed to see that support of these developments reflects their practical importance and that technology is developed to efficiently observe near shore waves, currents and dispersion. Investment in the identification and generation of products based upon model output (nowcasts, forecasts, statistical descriptors, and risk assessments).

4. Marine Life Resources Management and Ecosystem Health Assessment depend on ecosystem measurements, particularly of species and habitats. Species observations are the bases underlying scientific judgments and products related to resources and ecosystems. Existing surveys do not sample all habitats, nor are all species of concern surveyed; the frequency of observations are often below that required to rack annual trends, and enhancement beyond FY 04 levels is required. Similarly, present methods do not allow widespread sampling of many habitats. A national effort is needed to convert available research robotics, acoustic and optical survey methods into reliable and well calibrated tools to sample species abundance from habitats not now accessible.

5. Fluxes of fresh water, nutrients and pollutants from rivers and less concentrated run-off are important drivers of ocean circulation, biological productivity and patterns of the effects of pollution. Inputs of freshwater into the ocean should be determined by stream gauges and be augmented by measurements of nutrients, fecal indicators and other key pollutants and other constituents to determine their fluxes into the ocean.

5.2 Priorities for Regional Ocean Observations

1. Further develop pre-operational activities
   - Develop data management, data assimilation and nested ocean modeling systems of varying resolutions for all existing and predicted observations within the region including remote sensing, gliders, HF radars, shore stations, moorings, shipboard, and meteorological data. Initial goals of system should be directed towards the prediction of physical variables of the ocean (temperature, density, salinity) and currents which will be required for most all applications of ocean observing activities including national security, shipping management, search and rescue, water quality, marine life resource management, ecosystem health evaluation, and oil spill response.

- Conduct education and outreach to K-12 and beyond and local communities about the importance of regional and U.S. west coast oceanographic studies/operations.

2. Initiate pilot projects
   - Enhance near shore observations to allow effective prediction of 1) the initiation of algal blooms/red tides, their persistence, location, fate, and impacts on the surrounding ecosystems and human health; and, 2) the dispersion, transport, and impacts of land-based freshwater inputs and their constituents to ecosystems and human health. These observational projects will require deployment and integration of data from real-time, physical, bio-optical, and chemical sensors from moored and autonomous platforms (gliders, AUVs, drifters), shore stations, HF radars, stream gauges, vessel based sampling, and data from remote sensors into data driven models.
   - Enhance PORTS programs within Southern California ports to include data driven models of bay and estuarine circulation, forecasts of sea level, observations and models of diver visibility, transport of pollutants and sediments, and mapping of benthic and water column communities. Couple these PORTS systems to coastal ocean observational systems.
   - Develop small-scale, ecosystem monitoring systems to evaluate the effectiveness of Marine Protected Areas (MPA) and other Areas of Special Biological Significance (ASBS). A preferred method of developing a system of optimal marine protected areas includes (1) determination of local habitat types (2) determination of species affinities for these habitats (3) identification of goals and choice of species for the MPA (4) identification of the species and/or ecological processes indicative of the ecosystem state within the habitat (5) local circulation features that spread larval life (6) determination of adult movement from tagging studies. The parameters used to design the MPA or ASBS will require continuous observation over the lifetime of the MPA to determine is efficacy. Monitoring approaches would include traditional survey and sampling methodologies and acoustic methods coupled with concurrent studies of local circulation and regional oceanographic climate. SCUBA, ROV, and AUV surveys, benthic sampling, and acoustic surveys should focus on keystone species (larval, juvenile and adult life stages), indicator species and life stages and ecological processes, as well as species specifically targeted for protection in habitats targeted for protection. Circulation and climate data will be coupled with biological data for interpretation of biological change in terms of physical and biological forcing and the response of the system to protection.

3. Enhance operational capabilities
   - The highest priority in Southern California is to make available all oceanographic and surface meteorological data that has been and is being gathered. This requires finding and collecting the data, establishing quality control and assurance, describing measurement protocol and quality control methods, distributing data as rapidly as is feasible and archiving it in readily accessible yet safe forms. The tools to do this are available, but considerable

manpower is needed at the outset to set up procedures and work through existing data.

- Continuous knowledge of surface currents is of high priority because surface currents are central to so many management and safety issues (beach and water quality, oil spills and search-and-rescue, harmful algal blooms, biological connectivity, etc.) and because surface currents are a useful proxy for circulation at depth. Our goal is to complete an array of both high-resolution HF radars to describe shelf-scale circulation and long-range units to monitor seasonally changing circulation out to 150 km. As the array is established, the highest priority will go to making the system fully operational with minimal outages and useful products available on a 24/7 basis.
- Surface forcing by wind is central to variability in the ocean, and wind patterns vary widely over short scales near complex coastal topography. Operational modeling of coastal meteorology should be extended to sub-kilometer scales to generate products for users and to better force data-assimilating ocean models. Expansion of meteorological stations at the shoreline, on islands, and on small buoys near shore where possible.
- Establish best practice data management protocols that have national consensus in the management of observing system data. Fund specific data management activities in a vertically integrated, observation-user, approach for IOOS thematic areas of high priority.

4. Coordinate and continue research
   - Continue sensor and platform development to enable autonomous and real-time measurement of physical, chemical, and biological properties. Establish research programs to conduct the necessary science required for interpreting observations and developing end-user products.
   - Research efforts directed towards effective translation of user needs to sensible data products.

6.0 ISSUES, CHALLENGES AND OPPORTUNITIES

Expectation Management: Marketing efforts by NOAA and Ocean.US run the risk of raising expectations of local IOOS supporters and users to a level that may be difficult to meet in the foreseeable future. Regional organizations are faced with the challenge of generating enthusiasm for and participation in the promise of a national ocean observing network, yet remain grounded in the capabilities and time scales of IOOS implementation. With the reality of the federal budget, regional observing systems must be flexible in defining regional priorities and mechanisms for implementing those priorities.

Clarity on Outreach/Stakeholder Involvement: A successful observing system must strive to: 1) define the needs of the management community; 2) define the needs of mission driven agencies or compliance based monitoring communities; 3) identify the potential sources of operational support through delivery of data products based upon these needs; 4) communicate the capacity/vision of the utility of an integrated observing

approach; 5) integrate science education using the observing system; and 6) generate advocates for federally supported IOOS activities. As a result of these broad classes of outreach, confusion exists in the IOOS vision for stakeholder involvement. We have attempted to recognize the distinction between defining and creating the pull for SCCOOS, general marketing activities, and the communication and translation of data to meaningful information to aide decision-making processes.

Regional Definition: Identified variables chosen as priorities for the IOOS backbone will require significant integration and interpretation to honestly meet many regional user needs. "One size fits all" will not meet all local user needs.

PACOOS: The Pacific Coastal Ocean Observing System (PaCOOS) is a nascent effort being built by the NMFS to provide regular ocean observations along the entire U.S. west coast for managing fisheries and ecological change, and observing climate impacts on the coastal ocean. In some ways, PaCOOS is like a regional association (i.e. government and academic consortium, practical management objectives), and in others, it is more sensibly thought of as part of the national backbone, providing an offshore, large-scale context for RAs. However one views it, PaCOOS should be regarded as part of the emerging West Coast network of coastal ocean observatories. While PaCOOS has recently begun to engage the Regional Associations on the West Coast, no such complementary action appears to be taking place at Ocean.US to involve PaCOOS in prioritizing for the national backbone or in data management plans.

Certification: Regional Association certification criteria are still being developed and currently are under review by the NOAA legal office. Regional Associations, through NFRA, provided substantive comment to the draft criteria, and largely as a result of this feedback, the criteria were revised to reflect a more realistic and reasonable set of requirements. Also still in question is which office or agency has the legal authority to certify the Regional Associations. Until questions are answered surrounding the content of and authority for certification, Regional Associations must continue to develop based on local needs, available resources, and federal IOOS guidance.

Funding: The development of the regional association is still under funded in both data management and product generation activities. While SCCOOS is well positioned to generate and maintain local and regional ocean and coastal observations, what is lacking is the federal support to meet product development, back-end programming, and data integration and interoperability needs.

Liability: Concerns remain regarding liability in connection with: (1) business management and (2) distributing products to end-users. There is no clear understanding whether end users may rely and hold Regional Associations or their data providers financially liable for damages. SCCOOS addresses this issue by maintaining warnings or disclaimers at data distribution sites. For example, end users are cautioned by inclusion of such statements as, "this data is intended to be informative only and should not be relied upon to ensure safety," "this data is provided for the user's benefit and discretion in making informed decisions."

APPENDICES

APPENDIX A
LIST OF BOG, ESC, BEC, AND SAC MEMBERS

SOUTHERN CALIFORNIA COASTAL OCEAN OBSERVING SYSTEM

SCCOOS GOVERNANCE

SCCOOS Board of Directors

- Phil Bailey, *Dean of the College of Science and Mathematics, Cal Poly, San Luis Obispo*
- Diane Evans, *Earth Science and Technology Directorate, Jet Propulsion Laboratory, NASA*
- Steve Gaines, *Director, Marine Science Institute, UC Santa Barbara*
- Guadalupe Garcia, *Vicerector, UABC*
- *Javier Mendieta, Director General, CICESE*
- Tony Michaels, *Director of the Wrigley Institute for Environmental Studies, University of Southern California*
- Mary Nichols, *UC Los Angeles*
- John A. Orcutt, *Deputy Director, Scripps Institution of Oceanography*
- William H. Parker, *Vice Chancellor for Research, UC Irvine*
- Carlos Robles, *CEA-CREST Program Director, Cal State Los Angeles*
- Keith Stolzenbach, *Director, Coastal Center, Institute of the Environment, UC Los Angeles*
- Steve Weisberg, *Southern California Coastal Water Research Project Authority*

Executive Steering Committee

- Russ Davis, *Scripps Institution of Oceanography*
- Yi Chao, *Jet Propulsion Laboratory, NASA*
- Burt Jones, *University of Southern California*
- Libe Washburn, *UC Santa Barbara*
- Keith Stolzenbach, *UC Los Angeles*

Board Executive Committee

- John Orcutt, *Scripps Institution of Oceanography*
- Tony Michaels, *University of Southern California*
- Mary Nichols, *UC Los Angeles*
- Steve Weisberg, *Southern California Coastal Water Research Project Authority*

Senior Advisory Committee

- Brian Aldrich, *US Coast Guard*
- Jeff Crooks, *Tijuana National Estuarine Research Reserve*
- Chris Crompton, *Southern California Stormwater Monitoring Coalition*
- Linda Duguay, *USC Seagrant*
- Leslie Ewing, *State Coastal Commission*
- Roberto Garcia, *USN METOC*
- Dominic Gregario, *State Water Resources Control Board*
- Larry Honeybourne, *Orange County Health Care Agency*
- Samuel Johnson, *US Geological Survey*
- Captain Richard McKenna, *Marine Exchange of Southern California*
- Russ Moll, *California Seagrant*
- George Robertson, *Central Bight Water Quality Working Group*
- Walter Nordhausen, *California Oil Spill Prevention and Response*
- Dave Panzer, Minerals Management Services
- Jonathan Phinney, *NOAA Southwest Fisheries/PacOOS*
- Arthur Shak, *US Army Corps of Engineers*
- Sam Shuchat, *State Coastal Conservancy*
- Rebecca Smyth, *NOAA*

Operations

- Chief Operating Officer: Eric Terrill, Scripps Institution of Oceanography

GOVERNANCE DESCRIPTIONS

The *Board of Governors* (BOG) is comprised of the eleven signatories to the SCCOOS Memorandum of Understanding (MOU). The BOG creates positions, elected officers and fills advisory seats, including the Chairman of the BOG, and members of the Board Executive Committee (BEC), the Executive Steering Committee (ESC), the Senior Advisory Committee (SAC), and the Chief Operating Officer (COO). The BOG, with the advice of the BEC and ESC, makes all business decisions concerning SCCOOS management and operation with a commitment to the system's mission and longevity. The BOG also resolves any conflict arising from contract or agreement between consortium members or its representatives.

The *Executive Steering Committee* (ESC) role is to appoint an operating staff to manage the day-to-day functions of SCCOOS; convene an advisory group of users and funders; coordinate government relations and mobilize support for appropriations; plan and carry out a retreat to develop a 10-year vision for SCCOOS; establish formal and informal mechanisms to assure the greatest possible communication among members; and encourage and facilitate participation by members in SCCOOS activities,

The *Senior Advisory Committee* (SAC) serves in a guidance and advisory role to provide the BOG and ESC with insight and perspective on technical, market, legislative and political matters affecting SCCOOS. SAC members are representatives of federal, state, and regional agencies and working groups. The SAC provide a means for stakeholders to provide guidance to existing SCCOOS operations and participate in strategic planning efforts. The SAC communicates and interacts with the BOG, BEC, and ESC, and serves as an outside source of information and reference that links SCCOOS with the broad stakeholder interests and knowledge within the region. The SAC shares perspectives, mission objectives, regional priorities, strategies and design ideas for all aspects of the ocean observing system to foster cohesion of stakeholders' needs and to promote a unified system at both the regional and national levels.

APPENDIX B
BOARD OF GOVERNORS FEBRUARY 13-14, 2006 PLANNING MEETING MATERIALS

Southern California Coastal Ocean Observing System (SCCOOS)

Board of Governors Planning Meeting
February 13-14, 2006
UCLA Institute of the Environment

Minutes

Monday, February 13

1. Welcome and introductions, agenda review and summary of meeting goals

The Board of Governors meeting was convened at 9:00 a.m. Opening comments were made by Board Chairman John Orcutt. Board Members present were: Tony Michaels (USC), Mark Moline (Cal Poly SLO), Mary Nichols (UCLA), John Orcutt (SIO), Carlos Robles (CSU LA), Soroosh Sorooshian (UCI), David M. Tralli (JPL), Libe Washburn (UCSB), Steve Weisberg SCCWRP. Eric Terrill, Carolyn Keen, and Stephanie Peck staffed the meeting.

2. Overview of the draft Bylaws

John Orcutt presented the draft Bylaws and reviewed the functions of the Board Executive Committee (BEC), Executive Steering Committee (ESC), Senior Advisory Committee (SAC), and new program integration. There was discussion about some language and a conflict of interest question, and a few clarifications and corrections were made to the document. John reminded the Board that changes to the Bylaws will require a process of amendment.

Action: The Board voted to approve the Bylaws with agreed-upon changes.

3. Establishment of Senior Advisory Committee

Tony Michaels presented nominations for a Senior Advisory Committee (SAC). Staff has begun the process of extending invitations to serve on the SAC and received several responses so far. While the list of nominees is not all-inclusive, it is representative of institutions that will provide the input and experience needed.

It was suggested that consideration be given to two additions to the list: a Resources Agency designee and a representative for U.S. Fish & Wildlife Service. Discussion was held regarding potential names for agencies for which a nominee had not been identified. A Coast Guard representative is still needed, but the issue was raised of how to target the best person to represent all Coast Guard missions. Julie Thomas indicated she had a suggested name for Port of Long Beach.

The discussion including the following points and issues:

- The initial plan for the SAC was to start with government entities and evolve to get a broader audience, such as commercial interests. This was a logical first step in representing the effort as a federal activity.
- These are near term users with support of their agencies. They were also part of working groups. The SAC will serve as a communication vehicle out to other interests.
- The SAC is different than the broader public interest such as education and outreach. Those interests might be better served by another group. A board member asked to keep open the lines of communications and find ways to keep those interests in the process.
- Questions were raised about the SAC self governing or being governed by the Board, naming of a chair at this point, and BOG or ESC representation on the SAC. Rather than prescribing the SAC management now and setting up a structure that binds the SAC, it was suggested that the SAC be given the opportunity to see how members involve themselves and engage on different aspects. There was discussion about a BOG serving as liaison to the SAC but not serving as a member.
- It was suggested that terms be staggered so terms didn't end all at once.
- How would SAC provide leadership – developing guidance or adhoc advice, developing documents? Eric sees this as an evolutionary process and reiterated that we are truly interested in getting advice and guidance, and with the SAC we are creating a more formal mechanism for what many of these individuals already are doing. Through the Strategic Business Plan, more formal engagement for build-out will evolve.
- The plan for SAC: high level advisory body providing advise and guidance; meeting minutes will be distributed; a SAC member will volunteer to be chair and SAC can elect that person.

Action: The Board voted to approve the list of nominees for the Senior Advisory Committee and requested staff to continue efforts to secure participation.

4. Coordination of external communications with member institutions

In an interest to find the best ways to get communications out among the institutions, we are proposing that a network be developed of press officers with whom SCCOOS can coordinate communications. The process would entail identifying points of contact for the institutions and getting the network established. SCCOOS has been mentioned more in the paper and on television but what is missing is getting press relations established. We'll be working with the press contact at Scripps as well to look for more ways to involve media and get word out about SCCOOS.

- Oceans Communicators Alliance is already tuned into what SCCOOS is doing and has built up ocean literacy; Scripps is a major player in this. It is an easy avenue to get more word out.
- Is there a plan for SCCOOS-specific funded media strategy? Do we envision hiring our own professional? Maybe in the future; this is still early on and John wanted to raise awareness right now of this issue.

Action: Staff will pursue collecting names of points of contacts from the institutions to begin a process of coordinating communications.

5. Operational updates

Eric Terrill provided updates in the following areas:

- Funded Program
- Website
- Data management and products
- COCMP review and progress
- SCCOOS reporting requirements

We are a group of many – federal RAs map. IOOS 2nd annual implementation conference held in May 2005. We're different than the rest – formed under MOU before there was any flow of funding. Administration/contract arrangements with MPL and JIMO. Eric presented highlights of SCCOOS funded projects. In-kind funding already exists within SCCOOS of about $6.5 M. Eric reviewed work of different operations (working groups will cover in more detail). Presented COCMP status and participants.

SCCOOS web site has grown since initially in 2004; serves as one important means of communication. SCCOOS data management – gave overview of efforts thus far. Aggregated stations, over 400 now. Adopting best management practices, not waiting for federal guidance on this. Need in the future for a single FTE data manager, as classes of observations grow.

Opportunities for outside program integration: SCCOOS water quality – example of projects with public health agencies. 520 shoreline stations, monitored regularly. Idea is to set up a database of the observations. Eric reviewed some types of data becoming available: climatology, hydrograph, growing ad hoc network of near shore stations, near real-time remote sensing showing conditions over several days, HF radar.

CDIP coastal data – develop initial flagship products. Goals have been to not set in stone but to provide means of evolution. October 2005 needs assessment meeting was conducted. COCMP 2-day review in San Francisco; comments are coming in. Interim approval given to continue on; get final work plan for Year 2 approved.

Reporting requirements – large levels of reporting required by agencies; aggregate for annual to agencies, quarterly to state. Vehicle of maturity of organization (through reporting). Asking ESC to discuss this; discussed need for more efficient reporting. Will spell out format for annual report with submissions to us.

Are we able to ferret out usage? Marketing issue different than press issue. Don't catch usage of data that now falls under SCCOOS umbrella. How to capture others' data sites now that we might be the portal? Give credit to those agencies, but have to figure out how. This results from now having a one-stop shop capability.

Spectrum of products - problem is that spectrum on web site without categories of users. Will this evolve to data for customers? Now, product demonstrations, will be an iterative process. Starting place for discussion and to evolve resources that are limited now. In present funding situation, look at priorities of resources. There may be secondary providers data – how are customers using the data? How to capture those statistics in the aggregate? Irrespective of the portals, and credit to either or both? Need to provide functions but not scorecards. What is quid pro quo? Don't make it so onorous. Need to be able to document value return, make it clear; it then encourages people to want to play and see the value. Acknowledgement given of growth and development of web site. Do need to have a neighborhood store, not just one stop. Few semantic pages for classes of data, say boaters.

6. Federal updates

- NOAA - Becky Smyth

Becky Smyth indicated that in 2008, funds should be both in the Congressional budget and in the President's budget. Monies now are from Congressional budget, not President's. Funding opportunities: RFQ for $2 M, will be asking private industry to come up with system design concept. Expectation is that they will be addressing the Regional Associations. There will be a government bid for us to know who gets the qualifications. She spoke on the coastal storms program as well.

- NDBC - Richard Bouchard

Richard presented SCCOOS letter and requests to them. He presented their response to the requests.

- Ocean.US + NFRA

Eric Terrill presented the Ocean.US update. 2006 evolving plan, stimulate 10 agencies getting into their planning efforts. GEOSS efforts: coastal components, regional systems, National Backbone. Ecosystem based adaptive management – everyone is struggling to do more of this. Southern CA well positioned to do this; we're on track with some of national planning efforts.

- ORION - John Orcutt

In FY07 President's budget, $13.5M, largely for planning. Ocean's Initiative, total $306.5 m through 2012. Part of President's Initiative – 3 agencies – global, regional, coastal. There will be NSF funding associated with ocean observing initiative. OOI regarded as NSF's contribution to IOOS. The government's view of how IOOS and OOI are related. Will be substantial budget over next few years. The challenge will be to keep that kind of funding level going over next five years. Politically, not sure the commitment exists.

Design and implementation of OOI will be focus of March 2006 meeting in Salt Lake City. Would behoove us to have large membership at this meeting. There will be a large contingent of East Coast there.

John mentioned Southern California Marine Monitoring Conference, April 24-25, in Long Beach, and California and the World Ocean '06 in September 2006 in Long Beach.

- Ocean Research Advisory Panel (ORAP) - Steve Weisberg

Ocean Commission Report suggested need for reorganization of structure. Steve presented draft restructuring; it is somewhat similar to California's Ocean Science Trust.

- Oceans and Human Health Initiative - Steve Weisberg

Ocean and Human Health Initiative needs to be tied into ocean observing system. Need to ask how do we design an ocean observing system that ties into human health issues? Must get closer to shore and actually on land. Moorings – put in places where sources are coming in. USGS sites are going by the wayside. Stormwater and pipes – sewage treatment outfall, put your equipment there. Likely will develop pilot projects. SCCOOS is well positioned for this.

Two major problems: data driven, not product driven; great concern about earmarks. Almost all projects are earmarked-driven. Towards end, move forward w/initiatives. Three things are saleable and doable: 1) ocean transportation, 2) inundation, 3) public health, beaches in particular. Try to zoom in on these.

7. State updates

- OSPR - Walter Nordhausen, California Dept of Fish & Game

Walt presented OSPR's mission: protection of coastline, marine resources, shoreline. Preparedness – Area Contingency Plans (ACP) – community-based, identified sensitive sites and protection strategies.

- Sea Grant - Linda Duguay

Sea Grant receives federal funding, has to be matched $2 for every federal $1. Usually get this from state and university funding. Funds extramural research. UC serves all California, and USC serves five county area in LA along urban ocean. Call for proposals currently to look at ecosystem-based management approaches, including impacts by humans. Ocean Protection Council monies are supporting to fund coastal resources. Tends to be smaller grants, $20 K to $100 K range; $40-50K typical. Start to address questions with smaller amounts of money.

8. Executive Steering Committee update

Russ Davis presented an Executive Steering Committee update. Main job of ESC has been to arbitrate over allocation of SCCOOS money. COTS and COCMP – main programs. Russ gave an overview of what the ESC is charged with, inc. implement strategy decided by BOG. What has ESC done?:

- Define focus for initial capacity-building, primarily as a sustained observing system and not as short-term projects. Now have a project that is example of shorter term – an intensive application (HB06)
- Allocated NOAA COTS funding
- Oversee COCMP activities – state tells us more of what we can do
- Establish working groups for expert advice

9. Working group reports (working group reports available at www.sccoos.org)

- Remote sensing - Ben Holt – funded by NOAA and the state; described JPL tasks, SIO tasks. Displayed some of what they've been working on re. data products and what is available through web sites. Presented next steps and actions: establish user-driven requirements and value-added products.

- Modeling - Yi Chao – progress and near term actions presented.

- Moorings - Russ Davis – times series, near shore and multi-disciplinary moorings; sites are UCSB, UCLA, SLO
-
- HF Radar – Eric Terrill – needed to develop site assessment and site management tool. Has required extensive FCC licensing for existing and new sites.

- Education & Outreach - Harry Helling – Focus has been on how to interface with school students and have available data get to them. Weather and Water program for 5th graders; learned to work both sides. First attempt to simply use SCCOOS data. Numerous challenges, developed full 9-week curriculum. Can integrate data products into curriculum. Success is larger than SCCOOS: highly exportable, meets state standards, 1½ days to train.

10. Huntington Beach project update

Bob Guza provided an update on the planning for the Huntington Beach 06 demonstration scheduled for implementation in September-October 2006. Near shore defined as within 2 km of shore, where HF radar doesn't work. Presented goals; not typical SCCOOS experiment; this is more of a process experiment.

11. SCCOOS Program Integration

- Morro Bay Watershed Management Plan - Mark Moline

- MERHAB-RAPDALERT - Tony Michaels presented the project: Rapid Analysis of *Pseudo-nitzschia* and Domoic Acid, Locating Events in near-Real Time

12. Meeting adjourned at 5:00

Tuesday, February 14

1. Strategic Business Plan

Eric Terrill introduced the outline and format for the Strategic Business Plan and discussed the strategic business plan criteria provided by Ocean.US. Eric presented the following:

- The strategic business plan needs to be a road map indicating the vision of SCCOOS.
- SCCOOS will work closely with and at some level of commonality with CeNCOOS and the state.
- The plan needs to address:
    - Federal, state, and local relationships
    - Funding
    - Systems Operating Structure
    - Performance Measures
    - Customer Development
- The strategic business plan needs to look at what state and organizations can contribute and utilize these assets.

Considerable discussion took place, and Board members offered a variety of comments. A number of concerns and questions were raised about the development of the plan:

- The criteria provided by Ocean.US doesn't exactly resemble that of a common strategic business plan.
- Currently, there is no certification mechanism or structure in place other than writing something to meet the criteria.
- How do you develop a strategic business plan with no hope of funding or building capitol? Do we continue to develop goals and plans for the future with this outlook?
- How do you prioritize in the development of a strategic business plan?
- What is the difference between the implementation of a Regional Association versus a strategic business plan?
- What is the strategic business plan and who is guiding Ocean.US to create it?
- Are we potentially developing something we don't have a user for?

Additional feedback was received:

- The strategic business plan should be a living document that gets updates – perhaps under a 3-year working cycle.
- The strategic business plan is better developed sooner than later for the benefit of the state.
- The goal of the strategic business plan should focus on ecosystem-based management

- We should work on a short-term plan at first and then develop it into a long-term strategic plan.

2. Future directions and opportunities

- State Water Board - Mike Lyons

  The agency's goals are to protect water quality. The main areas of focus include swimming areas, healthy seafood, and ecosystem protection. The agency needs:
  - Fate transport (poor tracking)
  - Storm water discharge - don't know where going or settling out
  - HABs
    - What triggers them
    - Source tracking
  - Desalination

  For SCCOOS:
  - Relationship with agency/board may provide more funding possibilities and create products for direct user groups.
  - Relationship with 'marine recreationists' can't provide money or inspiration to make products

  Funding with state: SEP
  - SEP is an environmental project/program usually associated with another focus. It may provide $$ for SCCOOS.

- Leslie - CCC needs
  - Could definitely use SCCOOS products, especially for beach replenishment and sediment mapping

- OSPR dispersed oil monitoring plan for the State - Walter Nordhausen

- Mapping initiative - Neal Driscoll
  - Ideal leveraging for SCCOOS because of important implications (ex. seismicity)
  - In December, a group met at the California Habitat Mapping Initiative, sponsored by the Coastal Conservancy, to prioritize offshore mapping. It was made clear that a better link needs to be made between geology and biology.
  - State provides $1.2 million; Sanctuary Foundation $0.5 million to initiate. As a result of the meeting, the funds provided will be going to advance mapping in the region between Moss Landing and Bodega Bay.
  - Comprehensive, collaborative, statewide effort
  - Opportunity to leverage efforts and money from other (ex. industry)
  - SCCOOS sponsored Leah Hogarth for a graduate mapping project to help identify sand banks that can be used for beach armoring/nourishment.
  - The state is currently looking at millions of dollars for mapping regarding MPAs.

- California Terrain Mapping Program (CALTM) - Bob Guza
    - Using airborne LiDAR to map exposed beaches and to inventory change over large areas.
    - Goal is to document change rather than just produce static maps.
    - Focus:
        - Beach erosion
        - Wetlands
        - Seismicity
        - Landslides
        - Storm damage
    - Is there a proposal from Scripps to the state for using LiDAR?
    - CALTM plane engine upgrade (in TX) may help SCCOOS with mapping strategy?

- LTER CalCOFI - Ralf Goericke
    - SCCOOS covers 25% of cost involved in growth of CalCOFI
    - CalCOFI provides framework for SCOOS offshore observations
    - Funded SCCOOS biological programs in SoCAL Bight
    - Link CalCOFI observations to nearshore
    - Develop bio-optical priorities
    - HABs of SIO Pier
    - SIO pier sampling
    - SCCOOS funding allowed pier collections to continue following the termination of previous funding in 2000.
    - Funding focused on algal bloom phenomena, possible to predict or prevent?
    - SCCOOS needs more biology

- Oceans and human health –Steve Weisberg
    - Steve presented planned epistemology studies

- PACOOS - Russ Davis
    - Ecosystem side of CalCOFI - more than an individual species
    - Features
        - Sentinel lines
        - Survey
        - Protected species
    - Ideas
        - What specific things do we need to estimate climate impacts on ecosystems - work on this with NANOOS, CeNCOOS and SCCOOS
        - HAB forecast
        - Emphasize data system for providing ecological data
        - San Pedro time-series
        - other regional programs of interest

- CDIP – Julie Thomas
  - Running collaborative programs with SCCOOS
  - Initial goal: wave data out to users on a consistent basis
  - Funded: ACOE and state
  - Involved in IOOS effort
  - Approved by SCCOOS to employ a buoy in Mexico to measure swell
  - Doing nowcasts and forecasts
  - CDIP is a COE and IOOS component right now
  - CDIP/SCCOOS – involved on a national level, funded through COCMP
  - SF swell model exists
  - Represents a system of systems under the SCCOOS Regional Association

- CICORE – Rick Piper
  - 2 new buoys collecting CTD data in SoCAL up by next week
  - Sites are at LA River and 2 miles off Pt. Furman
  - Discussion & questions:
    - What comprises SCCOOS and an OOS?
    - What can we pursue as a long-term strategic goal?
    - What is our long term strategic goal?
    - User – prioritization of what users need
    - Scales
    - Integration of various times series that address user needs
    - Is it user driven or are we trying to do the science we think people need?
    - Are we aware if there is a market out there for these products?
    - We need value added products with different groups.
    - We can't get scientists to make priorities - we can only get them to say what they do. Response: That is why we have the SAC
    - Start to include volunteer driven constituency, such as Surfrider, Heal the Bay, etc.

- Education and Outreach – Cheryl Peach
  - Formalized workgroup with broad representation?
  - How is education a part of outreach?
  - Can start to get CA curriculum on board.
  - Is there anything we can do in the short term rather than the long term?
  - Does a product meeting search and rescue needs also meet educational needs?
  - There is little support for UC$$ for education.
  - Are the systems set up so that we won't need to find more funding?
  - How restricted is the view we take?
  - What is flexibility?
  - How do we decide priorities?
  - WQ is a big deal
  - Not just responsive to IOOS but also an interest in operational needs for the region.

3. Strategic planning and recommendations for build-out

John Orcutt resumed the discussion about the Strategic Business Plan.

- SCCOOS biology
- SCCOOS physical observations
- SCCOOS E&O
- SCCOOS products and marketing for thematic areas (WQ, eco, safety)

4. Working lunch

5. Meeting adjourned at 2:00

APPENDIX C
SCCOOS BYLAWS

Created February 2006
Last Amended:_____

BYLAWS

Article I. Name

Section 1. The name of the organization will be the Southern California Coastal and Ocean Observations System, henceforth referred to as SCCOOS.

Article II. Mission

The mission of the organization is:

Section 1. SCCOOS brings together coastal observations along the Southern California Bight to provide information necessary to address issues in coastal water quality, marine life resources, and coastal hazards. Working interactively with local, state and federal agencies, resource managers, policy makers, educators, scientists and the general public, SCCOOS will improve our understanding and delivery of coastal observations, and will allow us to better manage our coastal ocean environment.

Article III. Objectives

Section 1. The SCCOOS objective is to provide accessible data to resource managers and the public. Generally SCCOOS data will be open to all interested parties and available on the Internet at no cost.

Article IV. Consortium

Section 1. A Memorandum of Understanding (MOU) having 'the express aim of providing integrated coastal observations within Southern California Bight of California', henceforth referred to as the SCCOOS MOU, shall define the consortium members.

Section 2. A change of the consortium members shall be documented by an amendment to the SCCOOS MOU or a superceding SCCOOS MOU.

Section 3. While not incorporated, consortium members will have authority and responsibility over SCCOOS functions, officers, goals and purposes to assure its success and longevity much like corporate directors are responsible for a corporation's success. This authority is limited by individual institutional rules and regulations.

Section 4. Consortium members will collaborate to pursue the interests of SCCOOS through contracts, grants, task orders, or other mutual agreements between consortium members' home organizations. Terms, liability and management structures will be defined by written agreement.

Section 5. Consortium members shall represent generally, the interests, activities and mission of SCCOOS to the extent that they don't conflict with their home organization's rules and regulations.

Section 6. Consortium members may separate from SCCOOS if deemed desirable or may be removed by unanimous vote of the remaining consortium members. The action will be memorialized by an amendment to the SCCOOS MOU.

Article V. Consortium Structure

Section 1. The signatories to the SCCOOS MOU, referred to therein as Senior Representatives, shall constitute the Board of Governors (BOG).

Section 2. The BOG shall create positions, elect officers and fill advisory seats as it deems necessary. These shall include the Chairman of the Board of Governors, Board Executive Council (BEC), Executive Steering Committee (ESC), Senior Advisory Board (SAC), and Chief Operating Officer (COO).

Section 3. The BOG shall appoint a Chairman to serve as the BOG representative, spokesperson and SCCOOS signatory.

Section 4. With the advice of the BEC and ESC, the BOG shall make all corporate-like decisions concerning management and operation with commitment to the SCCOOS' mission and longevity.

Section 5. With the advice of the BEC and ESC, the BOG shall resolve any conflict arising from contract, agreement, or other between consortium members or its representatives. The BOG will commit due consideration to assuring and continuing balanced representation by the entire BOG.

Article VI. Elected Officers

Section 1. The BOG shall elect four (4) persons for the BEC to act in the interests of the BOG in circumstances where actions are time-sensitive and not otherwise included by the bylaws. In these circumstances, the BEC has discretion to handle the matter or to turn the matter over to the BOG at the next special or regular meeting. BEC actions will be posted on the SCCOOS web site and reviewed at the next meeting of the BOG.

Section 2. The BOG shall elect a COO to perform day-to-day program management of SCCOOS and act as the general manager for all grant and technical matters.

Section 3. The BOG shall elect five (5) persons for the ESC to advise the BOG on technical matters and strategic planning. In carrying out its mandate, the ESC will work closely with the COO.

Article VII. External Advisory Seats

Section 1. The BOG shall select the members to serve on the SAC to provide the ESC and BOG with insight and perspective on technical, market, legislative and political matters affecting SCCOOS.

Section 2. SAC members may be representatives from state and federal bodies, metropolitan working groups, private industry leaders, and non-governmental organizations/special interest groups. The SAC is intended to provide a means for funding agencies, federal and state stakeholders, and industry to a) provide guidance and comments to existing SCCOOS operations and b) participate in strategic planning efforts. The SAC is not intended to participate in the management and operation of the observing system and shall not have decision-making authority regarding SCCOOS operations unless specified within the contract/grant terms of a funded SCCOOS activity. The SAC shall be encouraged to communicate and interact with the BOG, BEC, and ESC and serve as an outside source of information and reference that links SCCOOS with the broad stakeholder interests and knowledge within the region.

Section 3. Candidates for the SAC shall be nominated by the ESC and selected by the BOG.

Section 4. Seats on the SAC are filled voluntarily, are not subject to a term, and may be relinquished at any time.

Section 5. An open seat on the SAC shall be filled by a new selection by the BOG.

Section 6. The SAC is invited to share perspectives, mission objectives, regional priorities, strategies and design ideas for all aspects of the ocean observing system to promote cohesion of all regional stakeholders' needs and to promote a unified system at both the regional and national levels.

Section 7. The SAC may participate in SCCOOS *ad hoc* and standing committees to ensure effective communication.

Article VIII. Voting

Section 1. Members of the BOG shall be entitled to representation and vote at all regular and special meetings. No individual member shall cast more than one vote.

Section 2. A quorum shall be 60% of the total number of members.

Section 3. A three-quarters vote of a quorum is required to elect an individual, to pass a resolution, or to amend the SCCOOS MOU.

Section 4. Officers may appoint a proxy for purposes of voting and meeting attendance. Officers may appoint a proxy in writing, filed with the Chairman of the BOG, 24 hours in advance of the meeting.

Article IX. Terms of Service

Section 1. The BOG, BEC and ESC shall serve without compensation.

Section 2. The term of the BOG shall be served on a voluntary basis but appointments will be the responsibility of the member institutions.

Section 3. If a vacancy occurs, among the BEC, ESC, or Chief Operating Officer, it shall be filled by the BOG at a special meeting called for that purpose, or at any regular meeting of the BOG. Voting shall occur in accordance with Article VIII.

Section 4. The term of the BEC and ESC shall be four (4) years, served on a voluntary basis and may be terminated upon 60-day notice. The first terms of the BEC and ESC commenced in November 2003. The SAC commenced in February 2006.

Section 5. Consecutive terms are permitted.

Article X. Financial Matters

Section 1. Grants and contracts for core SCCOOS programs shall be administered by Scripps Institution of Oceanography.

Section 2. The ESC shall determine the distribution of funds in the fairest manner possible and in accordance with the SCCOOS mission subject to performance standards established by the ESC and approved by the BOG.

Section 3. Funding distribution among its members and partners shall be determined by a majority vote of the entire ESC.

Section 4. The Chief Operating Officer, or designated SCCOOS administrators, will be responsible for notifying members and partners of funding, contract and technical matters.

Section 5. Donations or funding received by any of the member institutions to pursue specifically the SCCOOS mission shall disclose to the BOG existence of such donations or funding.

Article XI. SCCOOS Programs Integration

Section 1. SCCOOS integrated programs are programs administered by other organizations, having at least one objective in common with the SCCOOS mission, and working collaboratively with the SCCOOS consortium.

Section 2. Programs may be acknowledged and identified as a SCCOOS integrated program only with the written recommendation of the ESC to the BOG.

Section 3. SCCOOS integrated programs shall be considered in-kind funding for purposes of SCCOOS marketing, funding and business development.

Section 4. Data and data products shall be accessible to the public through the SCCOOS website without a fee in a timely manner.

Article XII. Strategic Business Plan

Section 1. SCCOOS shall develop and maintain a Strategic Business Plan.

Section 2. The Strategic Business Plan provides a definition of SCCOOS, its existing and future customer and consumer base, and an outline of its operations. The Strategic Business Plan will serve as the organization's road map and will provide guidance in establishing annual goals, developing markets, and pursuing new funded opportunities. It will also serve as a measure of how far SCCOOS has progressed towards achieving its strategic goals, and to recognize where the organization may need to adjust approaches or directions to achieve better results.

Section 3. The BOG and ESC will seek guidance from the SAC and other stakeholders in the development of the Strategic Business Plan.

Section 4. The Strategic Business Plan is intended to be a living document, to be updated at least once every three years. The implementation will be reviewed and discussed at each annual BOG meeting.

Article XIII. Meetings

Section 1. Meeting minutes will be recorded and made available to the public.

Section 2. The BOG, BEC, ESC, and SAC shall each hold a meeting at least annually.

Section 3. Committees, interested persons and stakeholders will be invited to attend at least one annual BOG meeting. Additional or special meetings held by the BOG may be held privately but remain subject to Article IX, Section 1.

Section 4. Votes and resolutions may be proposed and adopted electronically with participation of a quorum and three-quarters positive vote. Voters shall be given two weeks in which to respond. Lack of response shall be counted as an abstention.

Article XIV. Order of Business

Section 1. Roberts Rules of Order shall guide proceedings at all meetings not otherwise provided for in these Bylaws.

Section 2. SCCOOS shall maintain an interactive website for disseminating information, news and data. Effective means for providing comments will be made available on the interactive website.

Article XV. Amendments

Section 1. Amendments to these Bylaws must be approved by the three-quarters vote of a quorum.

Section 2. Amendments shall be recorded here. Amendments (Date, Article, Section) are as follows:

None.

APPENDIX D
EXAMPLES OF SCCOOS WEB-BASED PRODUCTS

Examples of SCCOOS web-based products displayed include:

- Data products generated from ocean and coastal observations programs
- COCMP surface current maps for both SCCOOS and CeNCOOS
- Huntington Beach 06 demonstration web site pages
- Hyperion Diversion environmental support web site pages

Automated Shore Stations

SIO Pier

Track the latest conditions at this location: XML

Latitude:	32° 52.02' N
Longitude:	117° 15.42' W

Operational since April 2005

Southern California Regions

Morro Bay
Santa Barbara Channel
Ventura County
Los Angeles
South Channel Islands
Orange County
North San Diego
San Diego / Mexico

Available Products

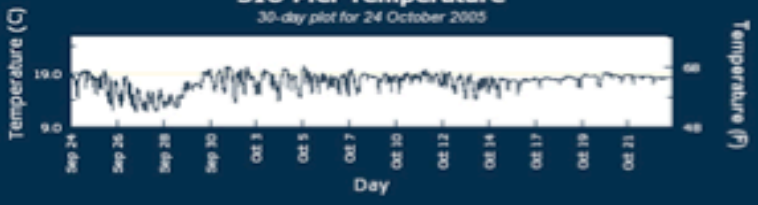
Automated Shore Stations
- Overview
- Bodega Marine Laboratory
- Golden Gate Bridge
- Santa Cruz Municipal Wharf
- Stearns Wharf
- Santa Monica Pier
- Newport Beach
- SIO Pier

Manual Shore Stations
Bathymetry
Moorings
Satellite Imagery
Shoreline Water Quality
Surface Current Maps
Surface Winds
Wave Conditions (CDIP)
Cast Data (Ships & Gliders)

Grab Raw Data

SIO Pier Temperature

30-day plot for 24 October 2005



[Grab raw Temperature data]

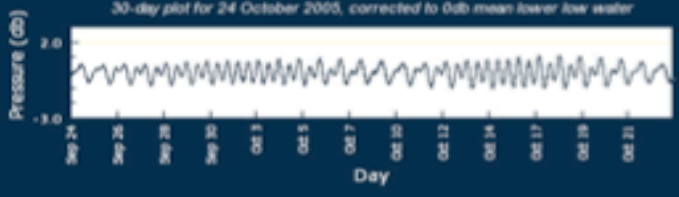
SIO Pier Salinity

30-day plot for 24 October 2005

[Grab raw Salinity data]

SIO Pier Pressure

30-day plot for 24 October 2005, corrected to 0db mean lower low water



[Grab raw Pressure data]

Southern California Regions

Morro Bay
Santa Barbara Channel
Ventura County
Los Angeles
South Channel Islands
Orange County
North San Diego
San Diego / Mexico
- Automated Shore Stations
- Manual Shore Stations
- Bathymetry
- Satellite (OCM) Color
- Satellite (MODIS) SST/Color
- Surface Currents
- Surface Winds (COAMPS®)
- Wave Conditions (CDIP)

Available Products

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Manual Shore Stations
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Moorings
Satellite Imagery
Shoreline Water Quality
Surface Current Maps
Surface Winds
Wave Conditions (CDIP)
Cast Data (Ships & Gliders)

Grab Raw Data

SCCOOS Bathymetry Data

San Diego

Lat/Lon/Depth zipped data file (3.85 MB)
Fledermaus iView3D zipped .sd file (3.24 MB)

3 arc-second DEM Resolution ~ Approx. 90m horizontal resolution

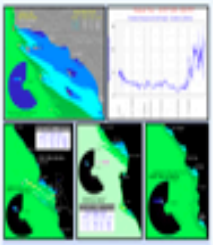
To view the iView3D .sd files, you will need to download the iView3D viewing software which is provided free-of-charge from their website (registration required).

Data provided by: The National Geophysical Data Center (NGDC)
Visualization by: The Scripps Institution of Oceanography's Visualization Center

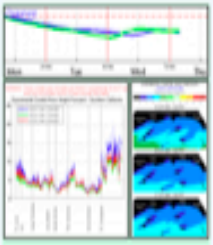
CDIP Recent Data

Summary Tables
9-Band
Parameter
Summary Maps
South CA: 9-Band
South CA: Parameter

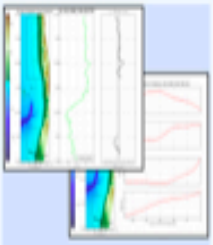
Descriptions/Help
Location list
Region Maps



Latest Nowcast Models
Updated: Mon, 17:35 UTC



Latest Forecast Models
Updated: Mon, 13:22 UTC



Latest Nearshore Models
Updated: Mon, 17:29 UTC

9-Band Summary Table

Units: metric | Timezone: UTC | update

Click any station for more details; data more than 3 hours old in red

Hs: Significant wave height Tp: Peak period Dp: Peak direction SST: Sea surface temperature

WAVES AND SEA SURFACE TEMPS		Date	Time	Hs	Tp	Dp	SST
Stn #	Station Name	(m/d)	(UTC)	(m)	(s)	(deg)	(C)
098	MOKAPU POINT, HI	10/24	17:24	2.73	11	9	26.4
106	WAIMEA BAY, HI	10/24	17:27	2.72	9	16	25.7
093	MISSION BAY, CA	10/24	17:30	1.59	15	260	18.3
073	SCRIPPS PIER, LA JOLLA CA	10/24	16:45	0.88	13		
100	TORREY PINES OUTER, CA	10/24	17:29	1.18	15	238	18.8
045	OCEANSIDE OFFSHORE, CA	10/24	17:04	1.18	15	208	18.5
067	SAN NICOLAS ISLAND, CA	10/24	17:30	2.52	15	292	15.6
096	DANA POINT, CA	10/24	17:28	0.98	15	208	17.9
092	SAN PEDRO, CA	10/24	17:28	0.95	15	244	18.4
172	HUNTINGTON BEACH NEARSHORE, CA	10/24	17:30	0.89	15	182	16.9
028	SANTA MONICA BAY, CA	10/24	17:16	1.03	15	211	17.5
111	ANACAPA PASSAGE, CA	10/24	17:31	1.45	11	274	16.5
107	GOLETA POINT, CA	10/24	17:27	1.25	15	267	16.5
131	RINCON NEARSHORE, CA	10/24	17:28	0.69	13	230	16.7
076	DIABLO CANYON, CA	10/24	17:13	2.33	15	268	12.9
029	POINT REYES, CA	10/24	17:28	3.48	13	298	12.4
094	CAPE MENDOCINO, CA	10/24	17:25	3.30	13	302	13.0
128	HUMBOLDT BAY SOUTH SPIT, CA	10/24	15:55	2.61	13	299	11.4
126	COOS BAY, OR	10/24	17:29	2.70	13	301	13.6
036	GRAYS HARBOR, WA	10/24	17:31	2.43	13	286	13.4
083	KINGS BAY, GA	10/24	17:29	1.31	4	40	
121	IPAN, GUAM	10/24	17:31	1.64	4	92	29.5

WINDS AND AIR TEMPERATURES		Date	Time	Speed (m/s)		Dir (deg)	Air
Stn #	Station Name	(m/d)	(UTC)	Avg	Peak	Avg	(C)
073	SCRIPPS PIER, LA JOLLA CA	10/24	16:45	3.56	4.70	260	15.9

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Los Angeles
Los Angeles to San Diego
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Orange County
North San Diego
San Diego
OCM Ocean Color
GOES 10 I.R.
GOES 10 Visible
GOES 10 Water Vapor
GOES West SoCal 11m
Shoreline Water Quality
Surface Current Maps
Surface Winds
Wave Conditions (CDIP)
Cast Data (Ships & Gliders)

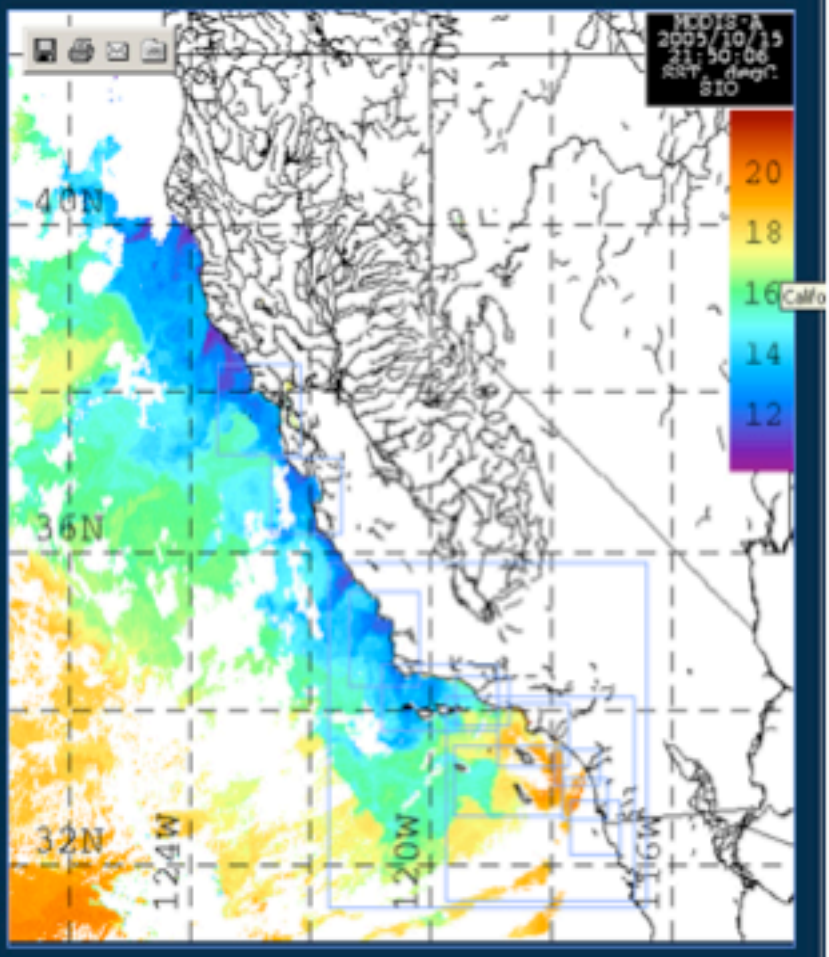
Grab Raw Data

MODIS Regions - ca

UTC Time: 2005-10-24 19:26:16
Local Time: 2005-10-24 12:26:16

Time of pass: Oct 15 2005 21:50:00 UTC

[Oct 22] [Oct 21] [Oct 20] [Oct 19] [Oct 18] [Oct 17] [Oct 16] [Oct 15]



Click on a region to view its most recent Chlorophyll and TSM data.

Disclaimer: Discrepancies between mapped data and coastlines may exist. Data has been automatically navigated and may require additional manual navigation. Heavy cloud cover is known to cause inaccuracies in the auto-navigation algorithm. Regional outlines are only an approximation of the actual region boundaries. For regions where data is not provided daily, the most recent data is displayed. This data should not be used for navigation or any other critical application which requires precise, up-to-the-minute data.


SCCOOS
SOUTHERN CALIFORNIA COASTAL OCEAN OBSERVING SYSTEM
ABOUT
DATA
MODELING
COMMUNITY and CLASSROOM
INTERACTIVE
HOME
Click map to reset.
Hourly Satellite Images
UTC Time: 2005-10-24 18:35:33
Local Time: 2005-10-24 11:35:33
GOES 10 I.R.
GOES 10 Visible
GOES 10 Water Vapor
GOES West SoCal 1km
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OCM Ocean Color
GOES 10 I.R.
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GOES 10 Water Vapor
GOES West SoCal 1km
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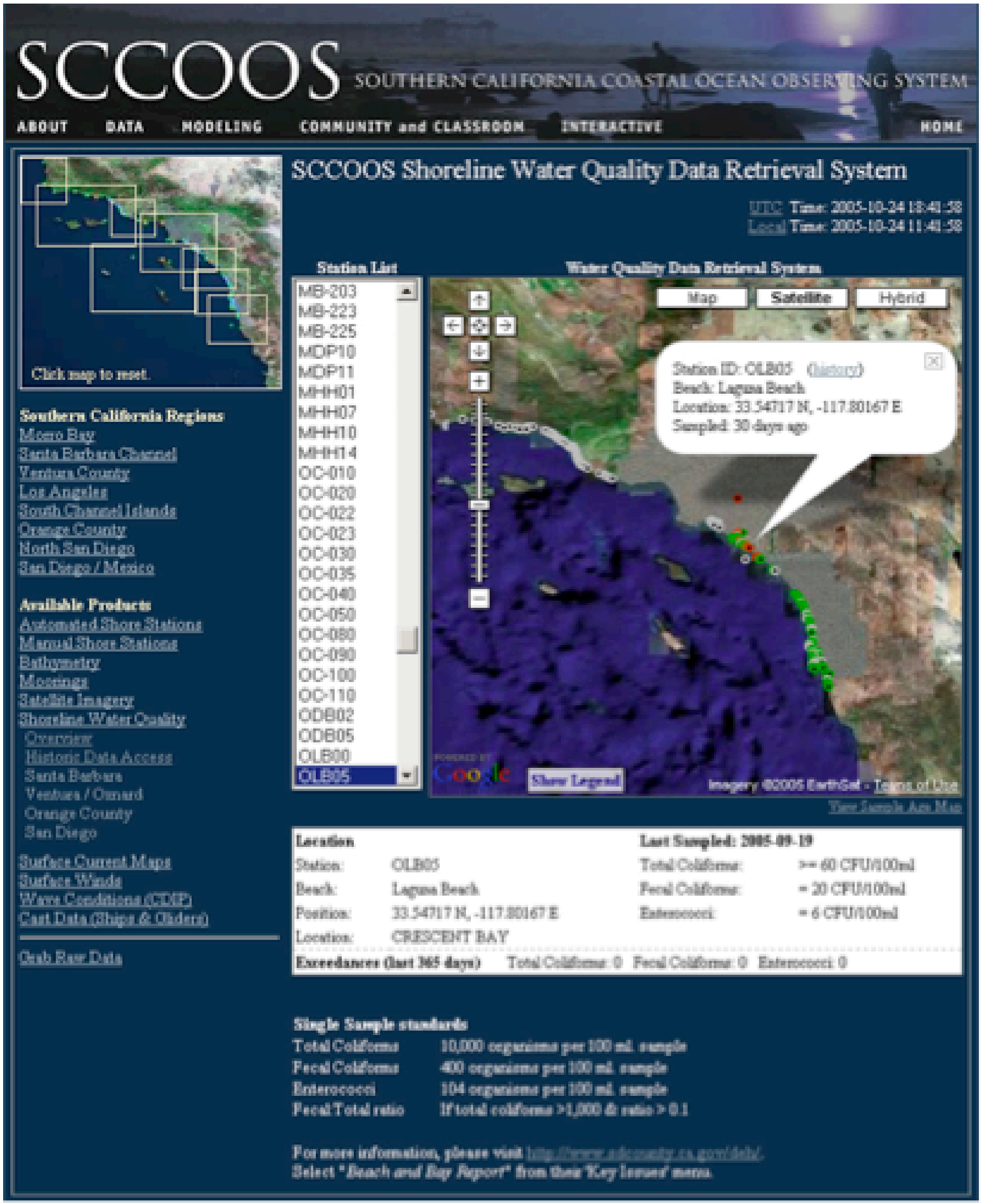
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SCCOOS Shoreline Water Quality Data Retrieval System
UTC Time: 2005-10-24 18:41:58
Local Time: 2005-10-24 11:41:58
Station List
MB-203
MB-223
MB-225
MDP10
MDP11
MHH01
MHH07
MHH10
MHH14
OC-010
OC-020
OC-022
OC-023
OC-030
OC-035
OC-040
OC-050
OC-080
OC-090
OC-100
OC-110
ODB02
ODB05
OLB00
OLB05
Water Quality Data Retrieval System
Map
Satellite
Hybrid
Station ID: OLB05 (history)
Beach: Laguna Beach
Location: 33.54717 N, -117.80167 E
Sampled: 30 days ago
Show Legend
Imagery ©2005 EarthSat - Terms of Use
View Sample Area Map
Location
Station: OLB05
Beach: Laguna Beach
Position: 33.54717 N, -117.80167 E
Location: CRESCENT BAY
Last Sampled: 2005-09-19
Total Coliforms: >= 60 CFU/100ml
Fecal Coliforms: = 20 CFU/100ml
Enterococci: = 6 CFU/100ml
Exceedances (last 365 days) Total Coliforms: 0 Fecal Coliforms: 0 Enterococci: 0
Single Sample standards
Total Coliforms 10,000 organisms per 100 mL sample
Fecal Coliforms 400 organisms per 100 mL sample
Enterococci 104 organisms per 100 mL sample
Fecal Total ratio If total coliforms >1,000 & ratio > 0.1
For more information, please visit http://www.sdcounty.ca.gov/deh/.
Select "Beach and Bay Report" from their 'Key Issues' menu.

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SOUTHERN CALIFORNIA COASTAL OCEAN OBSERVING SYSTEM

ABOUT DATA MODELING COMMUNITY and CLASSROOM INTERACTIVE HOME

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Cast Data (Ships & Gliders)

Grab Raw Data

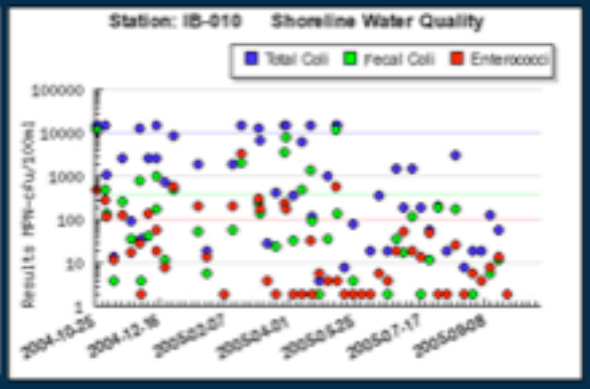
Water Quality Sampling

UTC Time: 2005-10-24 18:44:18
Local Time: 2005-10-24 11:44:18

Station List

IB-010
IB-020
IB-030
IB-040
IB-050
IB-060
IB-070
IB-080
MB-010
MB-020
MB-030
MB-031
MB-040
MB-041
MB-042

All Records for Last 365 Days



Station: IB-010
Beach: "Border Fence, N side"
Location: Border Field State Park
Position: 32.53530 N, -117.12500 E
Description: San Diego
Comments: State Beach

Exceedances (last 365 days)
Total Coliforms: 11
Fecal Coliforms: 11
Enterococci: 14

Download data

Date	Total Coliforms	Fecal Coliforms*	Enterococci
2005-09-27	< 2 CFU/100ml	< 2 CFU/100ml	E 2 CFU/100ml
2005-09-20	E 60 CFU/100ml	E 12 CFU/100ml	E 14 CFU/100ml
2005-09-15		< 69 MPN/100ml	
2005-09-13	= 130 CFU/100ml	E 6 CFU/100ml	E 8 CFU/100ml
2005-09-06	E 20 CFU/100ml	E 4 CFU/100ml	E 4 CFU/100ml
2005-08-30	< 20 CFU/100ml	< 2 CFU/100ml	E 6 CFU/100ml
2005-08-23	E 8 CFU/100ml	E 2 CFU/100ml	E 2 CFU/100ml
2005-08-16	E 3200 CFU/100ml	E 180 CFU/100ml	E 20 CFU/100ml
2005-08-09	< 20 CFU/100ml	E 2 CFU/100ml	E 2 CFU/100ml
2005-08-02	E 220 CFU/100ml	E 200 CFU/100ml	< 2 CFU/100ml
2005-07-26	E 60 CFU/100ml	E 12 CFU/100ml	= 52 CFU/100ml
2005-07-19	< 200 CFU/100ml	E 2 CFU/100ml	E 14 CFU/100ml
2005-07-12	E 1600 CFU/100ml	E 120 CFU/100ml	< 20 CFU/100ml
2005-07-05	< 200 CFU/100ml	E 10 CFU/100ml	= 56 CFU/100ml
2005-06-28	= 1500 CFU/100ml	E 36 CFU/100ml	E 20 CFU/100ml
2005-06-21	< 20 CFU/100ml	E 2 CFU/100ml	E 4 CFU/100ml
2005-06-14	E 380 CFU/100ml	E 6 CFU/100ml	E 6 CFU/100ml
2005-06-07	E 20 CFU/100ml	< 2 CFU/100ml	E 2 CFU/100ml
2005-05-31	< 2 CFU/100ml	< 2 CFU/100ml	< 2 CFU/100ml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San Diego
Tijuana
Ensenada
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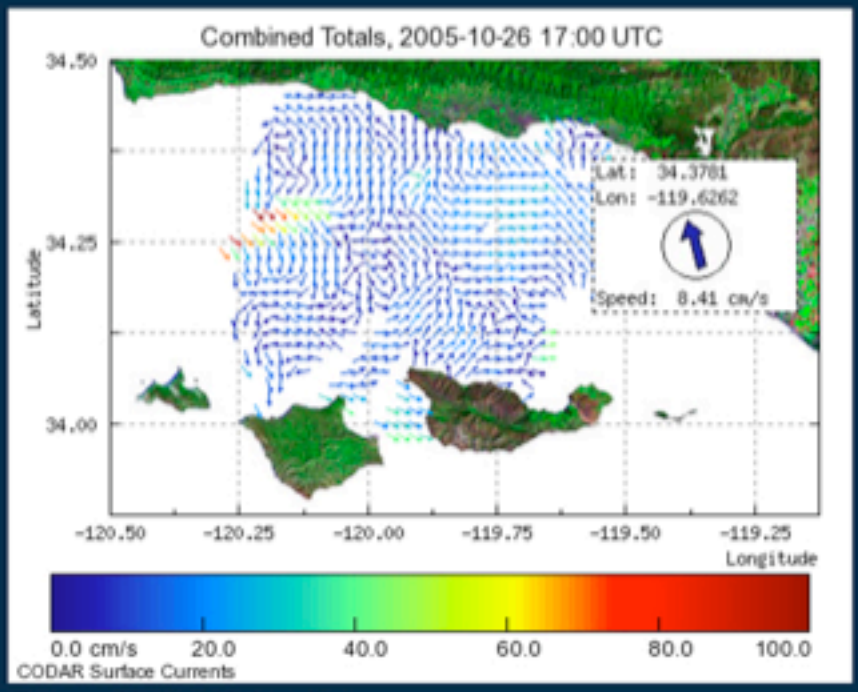
CODAR Surface Currents - Santa Barbara Channel

UTC Time: 2005-10-26 19:20:12
Local Time: 2005-10-26 12:20:12

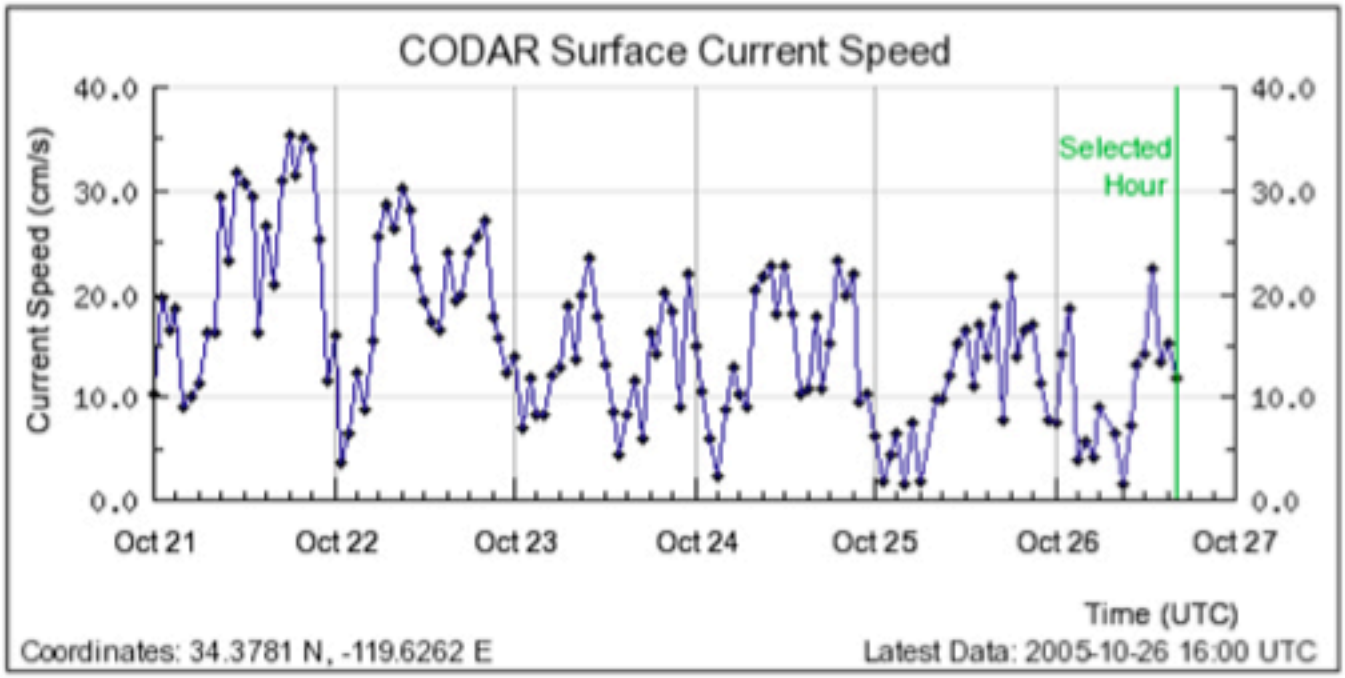
Hourly Totals
Current Time Sample: 2005-10-26 17:00 UTC

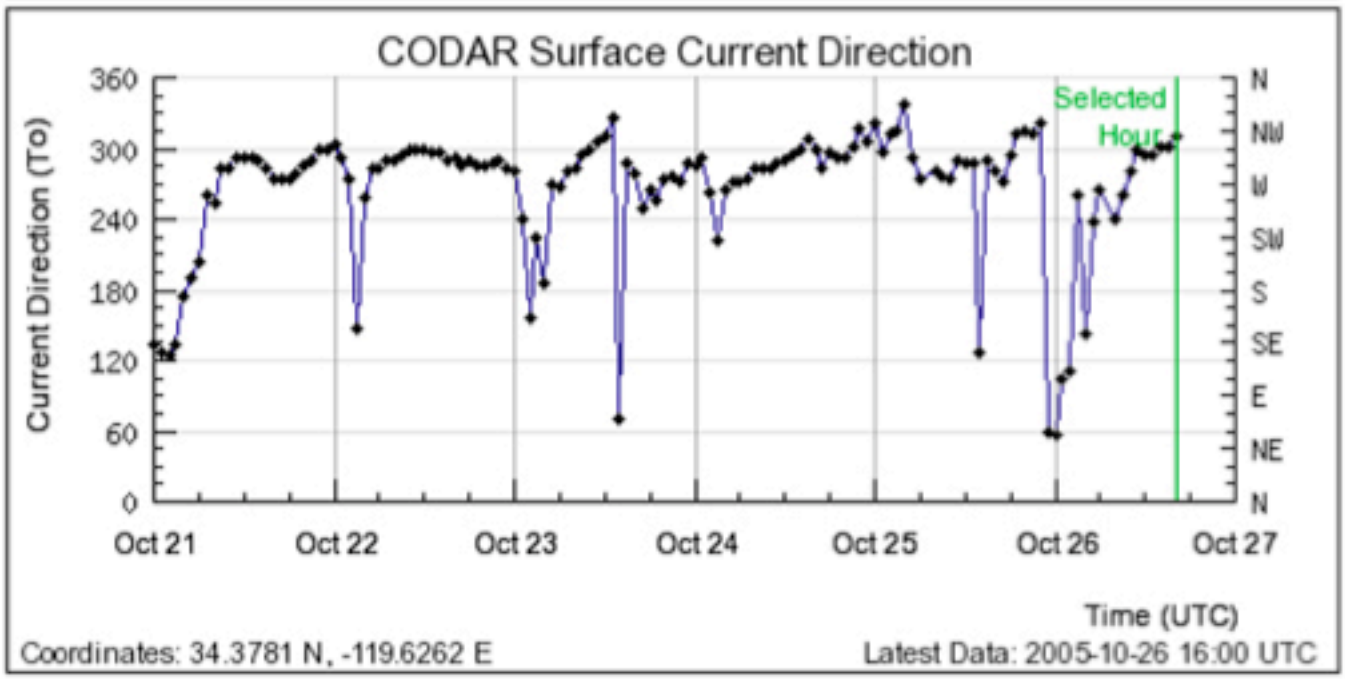
-24 -23 -22 -21 -20 -19 -18 -17 -16 -15 -14 -13 -12 -11 -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 NOW
Now Showing



Data provided by UC Santa Barbara

This map uses javascript, mouse-overs, image maps, and more!
Read our features tutorial for more information.


CODAR Surface Current Speed
Current Speed (cm/s)
40.0
30.0
20.0
10.0
0.0
Selected Hour
Oct 21
Oct 22
Oct 23
Oct 24
Oct 25
Oct 26
Oct 27
Time (UTC)
Coordinates: 34.3781 N, -119.6262 E
Latest Data: 2005-10-26 16:00 UTC


CODAR Surface Current Direction
Current Direction (To)
360
300
240
180
120
60
0
N
NW
W
SW
S
SE
E
NE
N
Selected Hour
Oct 21
Oct 22
Oct 23
Oct 24
Oct 25
Oct 26
Oct 27
Time (UTC)
Coordinates: 34.3781 N, -119.6262 E
Latest Data: 2005-10-26 16:00 UTC

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- San Diego

Cast Data (Ships & Gliders)

Grab Raw Data

CDIP Swell Height

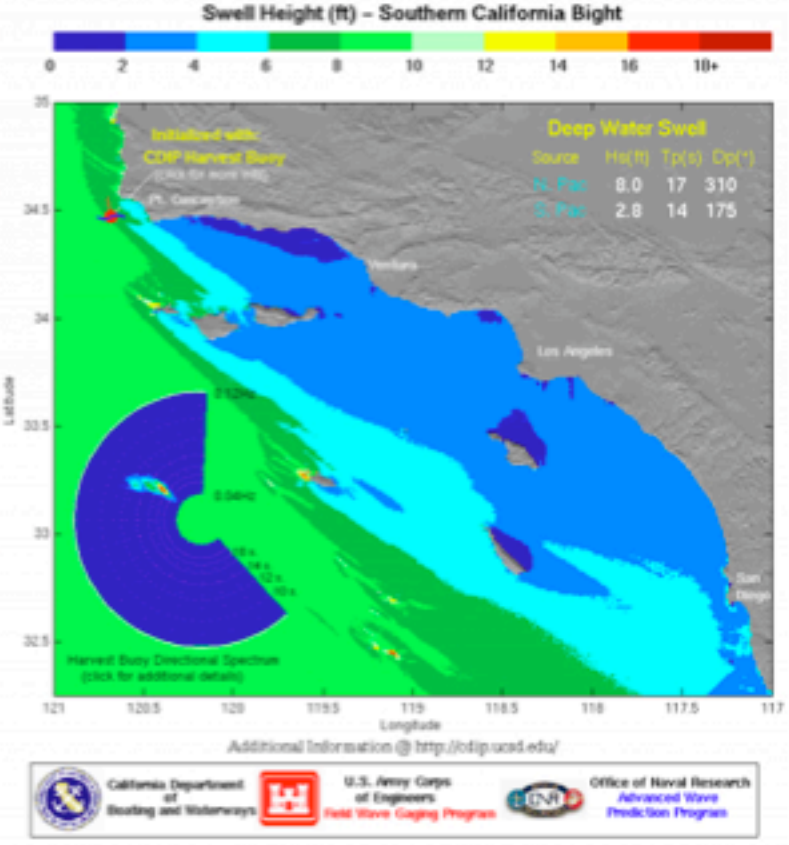
Southern California

UTC Time: 2005-10-24 19:00:20
Local Time: 2005-10-24 12:00:20

The Coastal Data Information Program
Center for Coastal Studies
SCRIPPS INSTITUTION OF OCEANOGRAPHY

Analysis Time – 24 OCT 2005 : 0630 PST

Swell Height (ft) – Southern California Bight



Additional Information @ http://cdip.ucsd.edu/

California Department of Boating and Waterways
U.S. Army Corps of Engineers
Field Wave Gaging Program
Office of Naval Research
Advanced Wave Prediction Program

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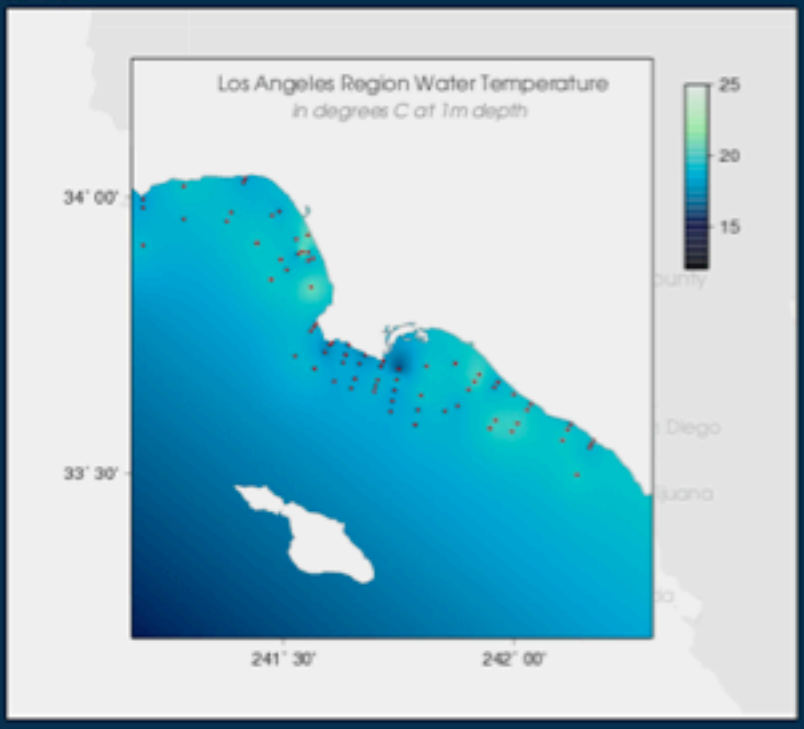
- Los Angeles

Grab Raw Data

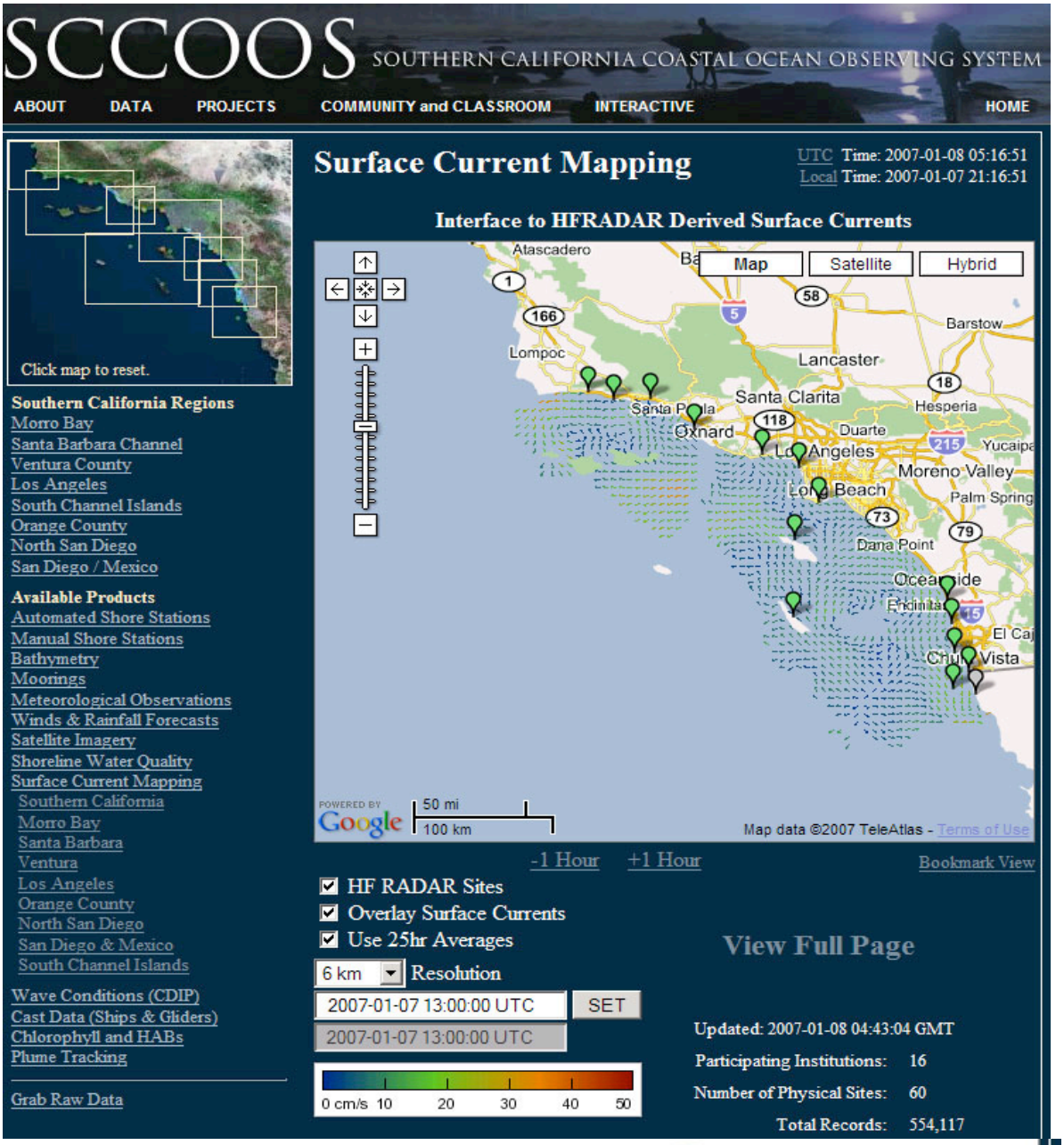
Cast Data



Click on the sites (in red) for more information.

The data for this program originates from the Central Bight Water Quality Program. This program is a collaborative program between the Orange County Sanitation District (OCSD), the County Sanitation Districts of Los Angeles County (LACSD), the City of Los Angeles Department of Sanitation (Hyperion), and ABC Labs for the City of Oxnard (Oxnard).

This program has been conducted quarterly from July 1998 through the present. All sampling is conducted using Seabird CTDs at fixed stations and using similar methods. In most cases, the entire grid is sampled in a three to four day period.



cocmp

Coastal Conservancy

Ocean current maps are a product of the Coastal Ocean Currents Monitoring Program (COCMP). The project is funded by California State Coastal Conservancy and the State Water board with resources from California Clean Water, Clean Air, Safe Neighborhood Parks, and Coastal Protection Act of 2002 and the Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002. COCMP is managed by the California State Coastal Conservancy.

CeNCOOS

CENTRAL & NORTHERN CALIFORNIA OCEAN OBSERVING SYSTEM

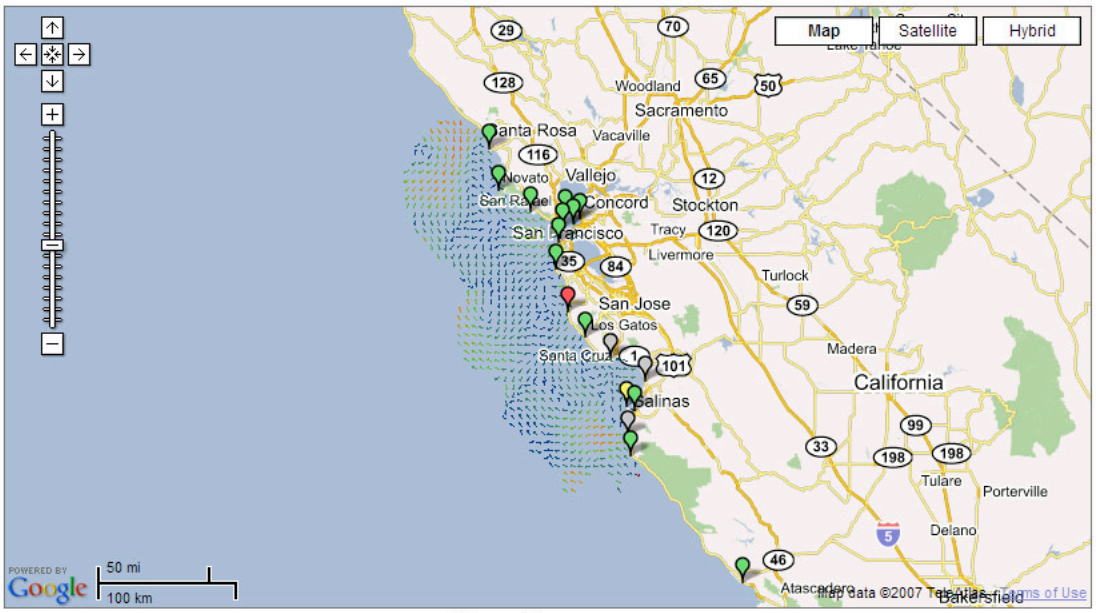
Observing Activities | Products & Data | Coastal Conditions | News & Events | About CeNCOOS | Get Involved

REGIONAL VIEW
Bodega Bay
San Francisco Bay
Año Nuevo
Monterey Bay

Product View
Hourly Currents
25-hr Mean Currents
RADAR Locations

Surface Current Mapping

Interface to HFRADAR Derived Surface Currents



-1 Hour +1 Hour

Bookmark View

- [x] HF RADAR Sites
- [x] Overlay Surface Currents
- [x] Use 25hr Averages

6 km Resolution

2007-01-09 23:00:00 UTC SET

2007-01-09 23:00:00 UTC

2007-01-09 15:00:00-0800

0 cm/s 10 20 30 40 50

View Full Page

Updated: 2007-01-10 21:25:06 GMT

Participating Institutions: 16

Number of Physical Sites: 60

Total Records: 557,883

Station status is monitored in near real-time.

There is an xml station status file that provides basic metadata for reporting stations.

Coastal Conservancy

cocmp

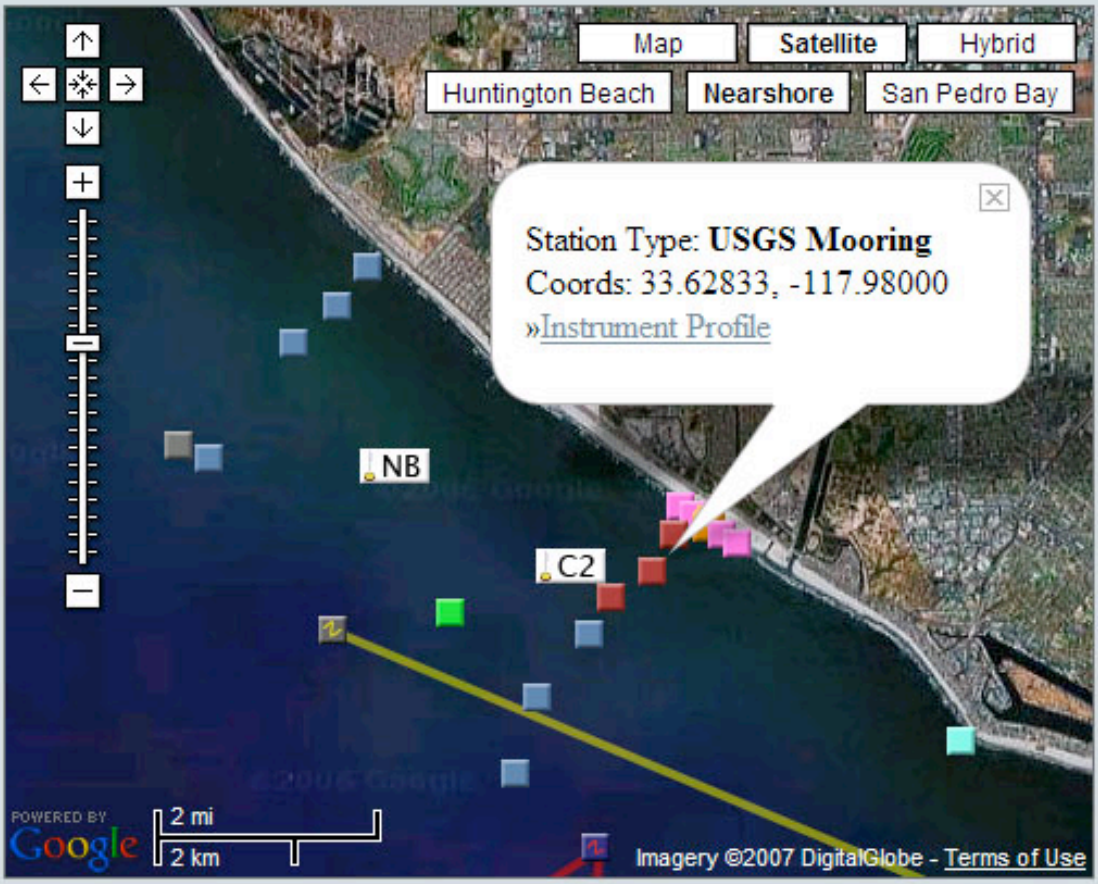
Ocean currents maps are a product of the Coastal Ocean Currents Monitoring Program (COCMP). The project is funded by the State of California from the California Clean Water, Clean Air, Safe Neighborhood Parks, and Coastal Protection Act of 2002 and the Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002.

Huntington Beach 2006

WHERE ARE THE OBSERVATIONS?

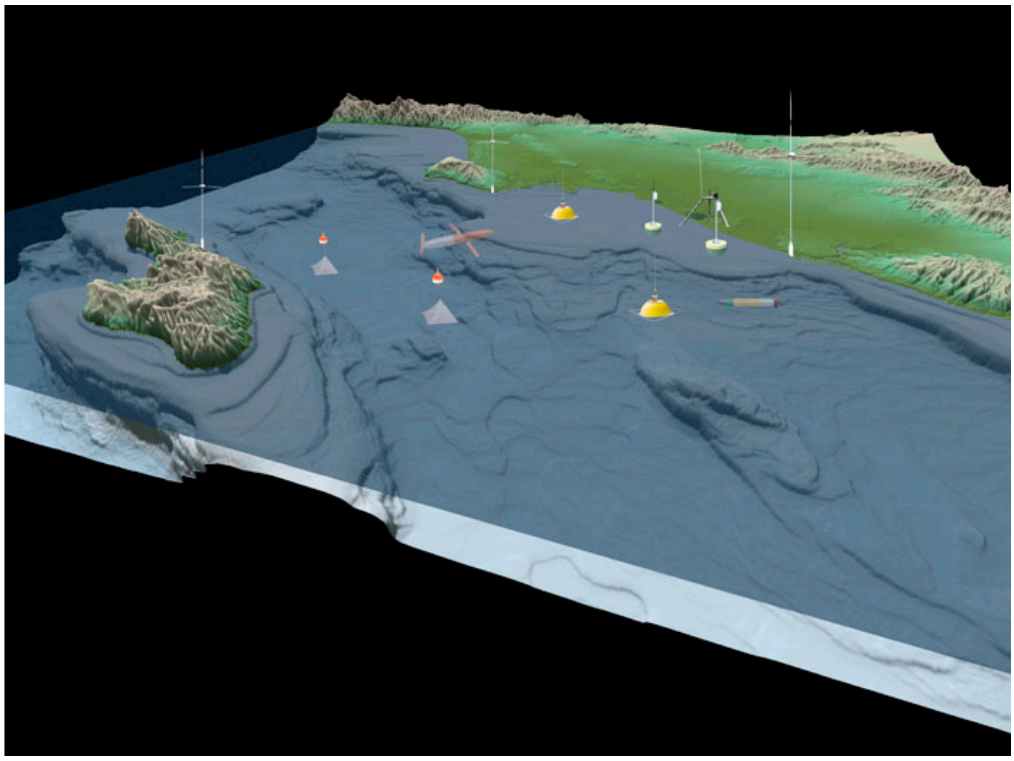
SCCOOS assets are deployed in the surfzone, nearshore, and offshore Huntington Beach.

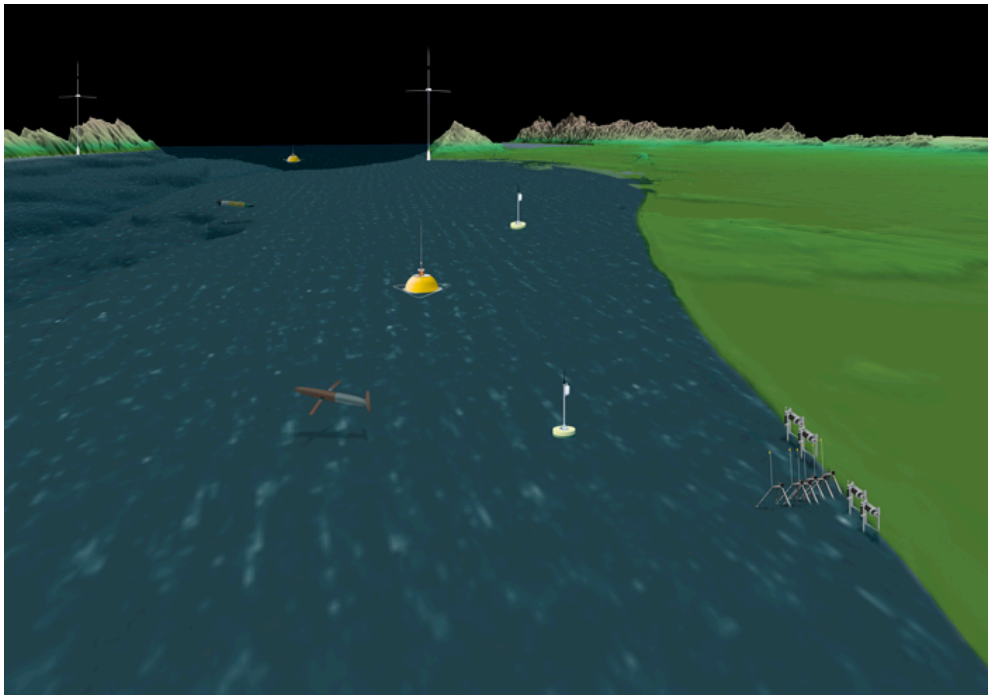
EXPLORE BELOW



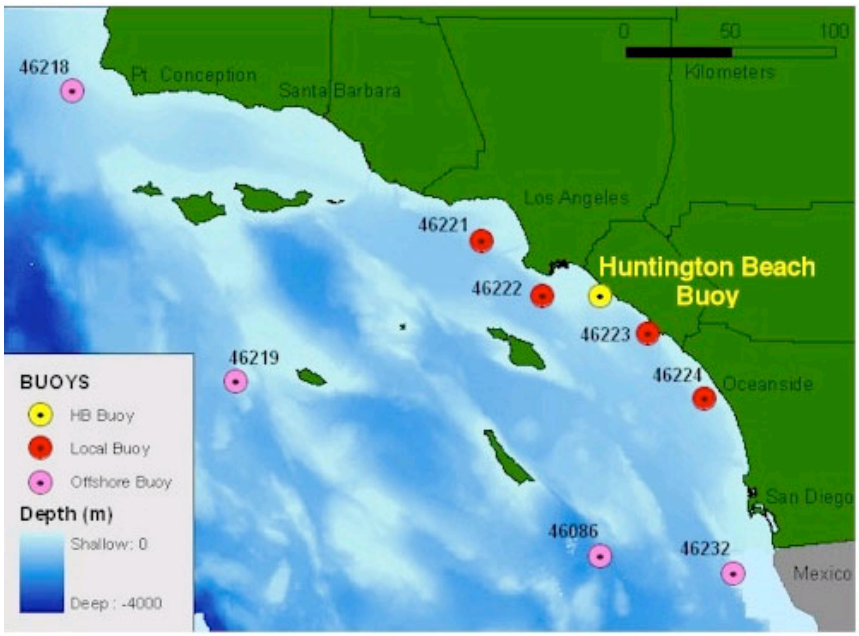
Bookmark this view

Also available: HB06 Project Calendar.





Huntington Beach Nearshore Experiment



The Huntington Beach Nearshore Experiment (HB06) will improve understanding of the processes that transport and disperse sediment, biota, and pollutants in shallow water.

HB06 (**overview**) is a component of the Southern California Coastal Observing System (**SCCOOS**).

Waves & Beaches at HB06:
- **Overview**
- **Wave Buoy Observations**
- **Surfzone Wave & Currents**

Beach Sand Level Surveys:
- **Airborne LIDAR**
- **In-the-water**

HB06 is principally funded by: Coastal Conservancy, NOAA

with additional support from **Sea Grant, ONR, USACE, CDBW, USGS, OCSD**

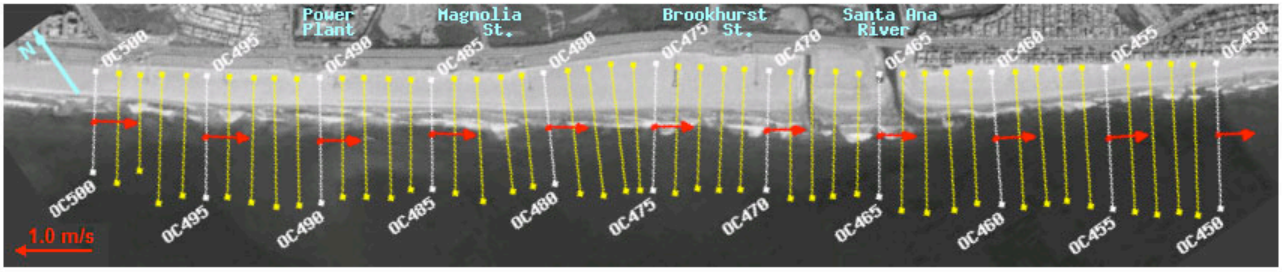
HUNTINGTON BEACH NEARSHORE EXPERIMENT

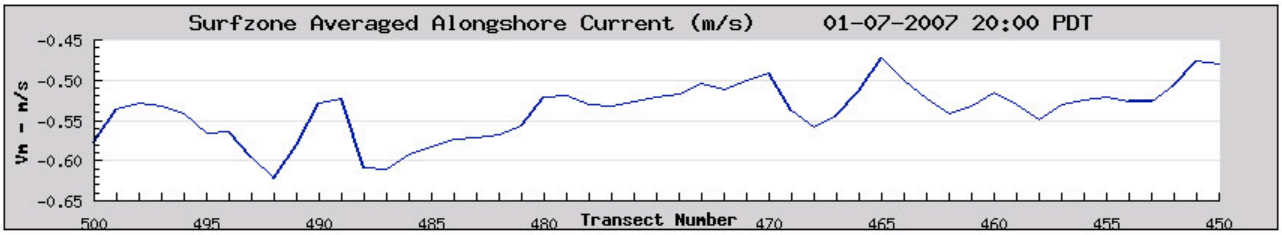
Nearshore Model | Buoy Measurements | Bathymetry | Model/Measured Comparison

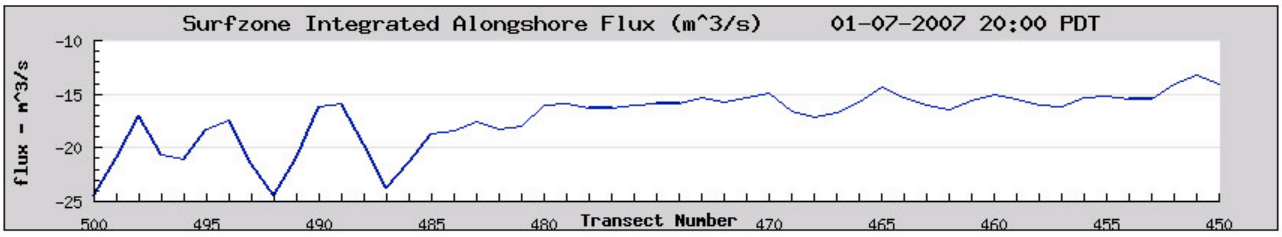
HB06 - Nearshore Model

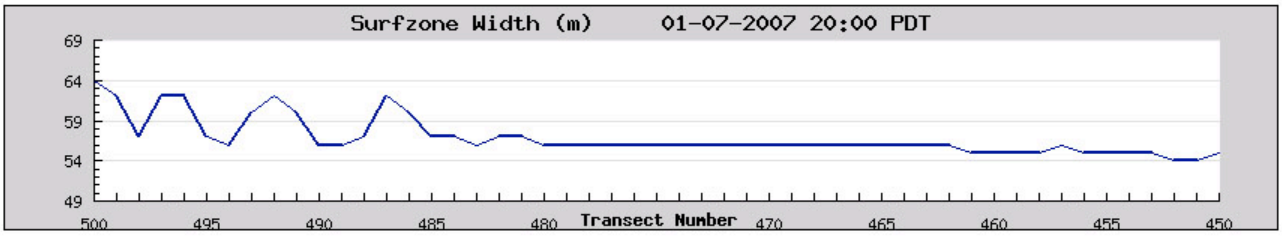
Nowcast | Forecast

View: Alongshore Cross-shore Time series Parameters: Surfzone Waves Timezone: PDT UTC







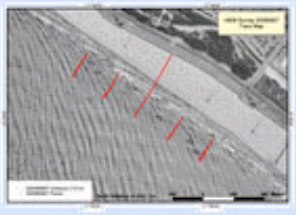
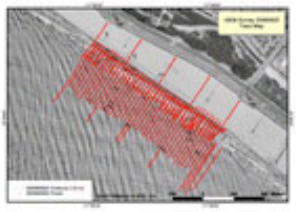
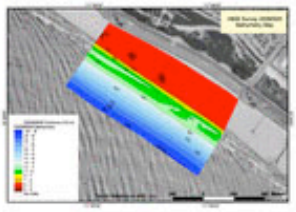
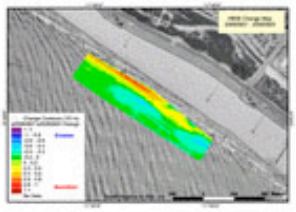
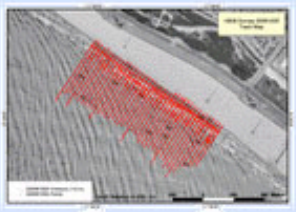
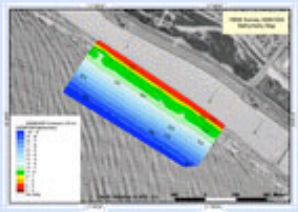
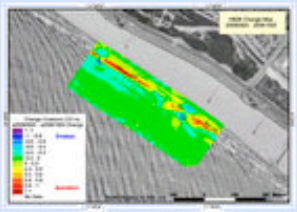
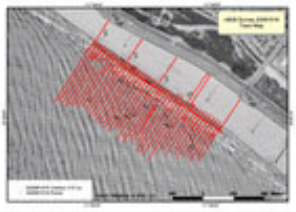
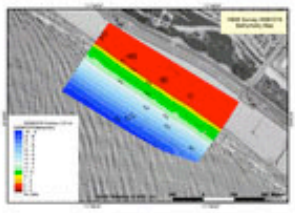
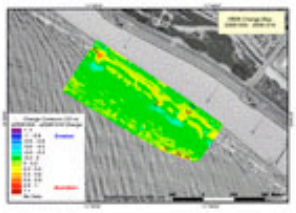


HUNTINGTON BEACH NEARSHORE EXPERIMENT

Nearshore Model	Buoy Measurements	Bathymetry	Model/Measured Comparison

HB06 Bathymetry Measurements

SIO In-Situ	Airborne LIDAR	Multibeam Bathymetry	USACE Historical Profiles

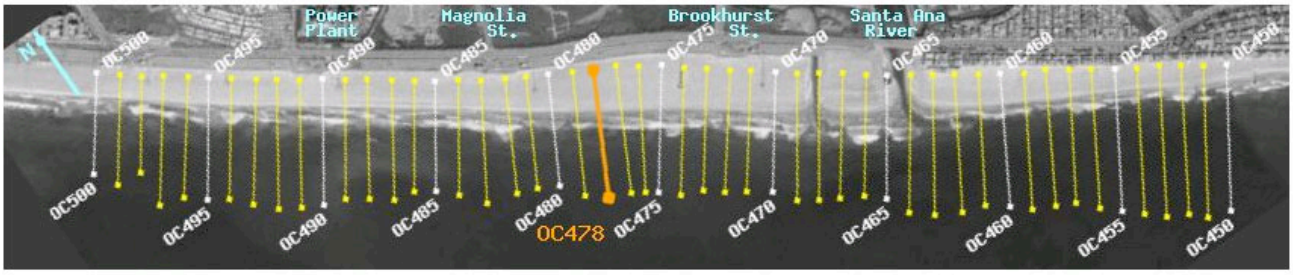
Survey Date	Tracklines	Bathymetry	Sand Level Changes
20060907		N/A	N/A
20060925			
20061005			
20061016			

HUNTINGTON BEACH NEARSHORE EXPERIMENT

Nearshore Model | Buoy Measurements | Bathymetry | Model/Measured Comparison

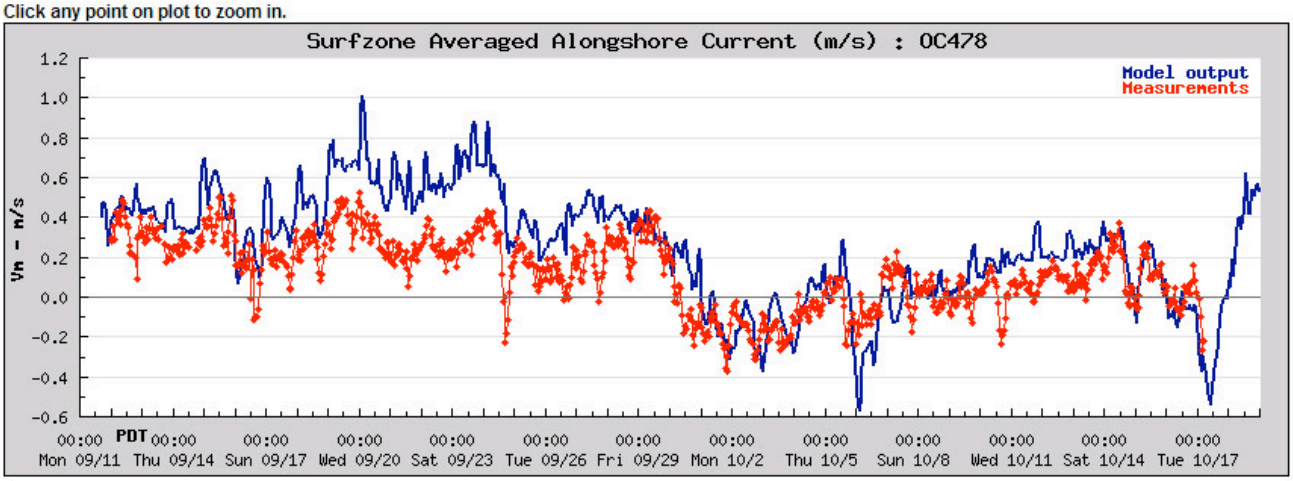
HB06 - Model/Measurement Comparison

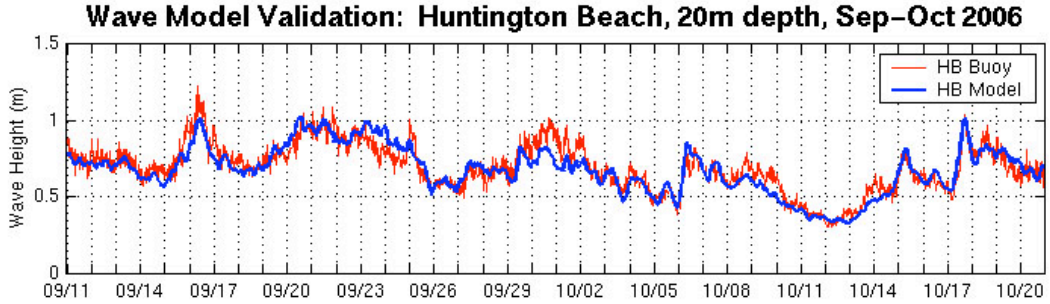
Timezone: PDT UTC



Nearshore model/field measurement comparison: 09/12-10/18 2006

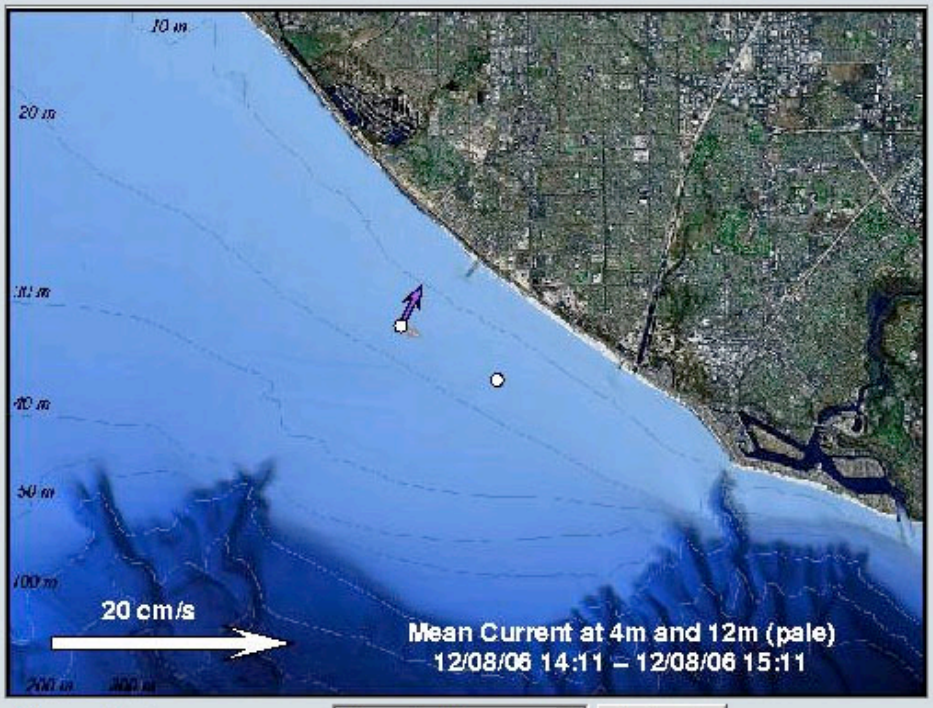
Click any point on plot to zoom in.





Huntington Beach 2006

SCCOOS OCEAN MOORINGS

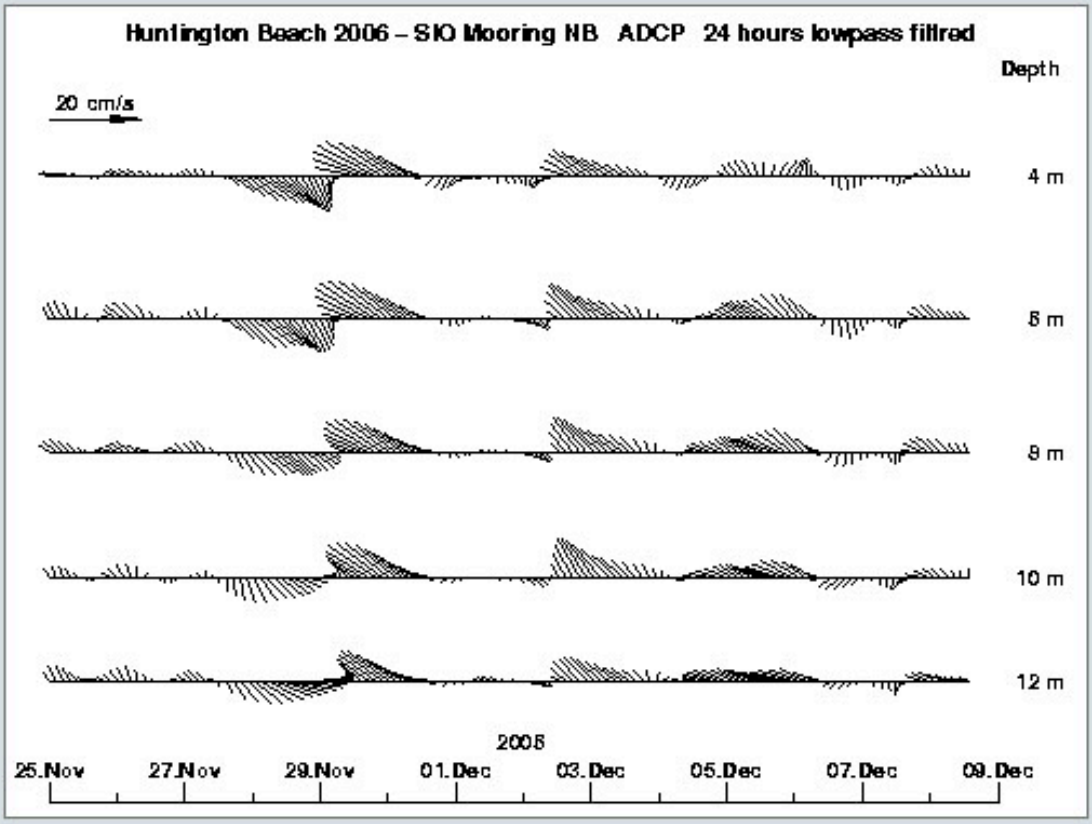


Observation type: Currents Map Animate

Higher Resolution:
Click on the image above to open a new window showing the image at full resolution.

Huntington Beach 2006

SCCOOS OCEAN MOORINGS



Observation type: Current Sticks

Duration of plotting window: 2 weeks

Mooring Installation: SIO-NB2

Higher Resolution:

Click on the image above to open a new window showing the image at full resolution.

Huntington Beach 2006

SCCOOS Projects

- Hyperion Diversion
- Huntington Beach (HB06)
  - Overview
  - Instrument Map
  - Project Calendar

Huntington & Newport Beach

- CDIP HB06 Experiment Pages
- Surfzone Waves and Currents
- Newport Pier Shore Station
- SCCOOS Ocean Moorings
  - SIO-C2
  - SIO-NB2
- Meteorological Observations
- Water Quality Samples
- **Forecasts**
  - Winds
  - Precipitation
  - NWS Weather Forecast

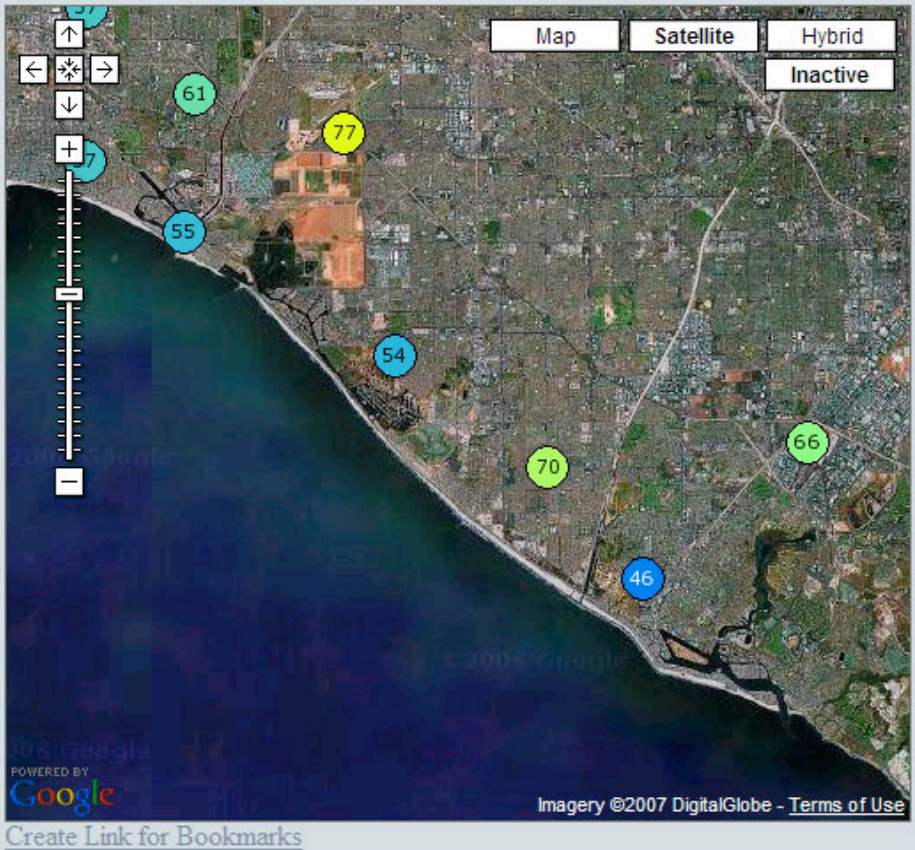
Greater San Pedro Bay Region

- CalPoly REMUS AUVs
- Rutgers Inshore Gliders
- UCSB Ocean Drifters
- Scripps Ocean Gliders
- JPL Ocean Simulation
- Spray Gliders
  - Mission 0011
  - Mission 0012
- Surface Currents
- Meteorological Observations
- **Forecasts**
  - Winds
  - Precipitation
- **Satellite Products**
  - OCM
  - MODIS
  - Hourly GOES
- Wave Observations

Learn about Instruments

- Overview
- HF Radar
- REMUS AUV
- Offshore Drifters

RECENT METEOROLOGICAL STATIONS REPORTING



Create Link for Bookmarks

Now Showing:

Channel: Air Temperature Units: °F

Filters:

Providers:

- MARITIME
- SCCOOS
- OCSD
- MesoWest
- RAWS
- APRSWXNET
- OTHER-MTR
- WXforYou
- NOS-PORTS

Regions:

- Morro Bay
- Santa Barbara Channel
- Ventura County
- South Channel Islands
- Los Angeles County
- Orange County
- North San Diego
- San Diego
- All Regions

Distance: < 15 km

View Experiment Data

October 2006

Su	M	T	W	Th	F	S
01	02	03	04	05	06	07
08	09	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

<< < > >>

HB06 Products

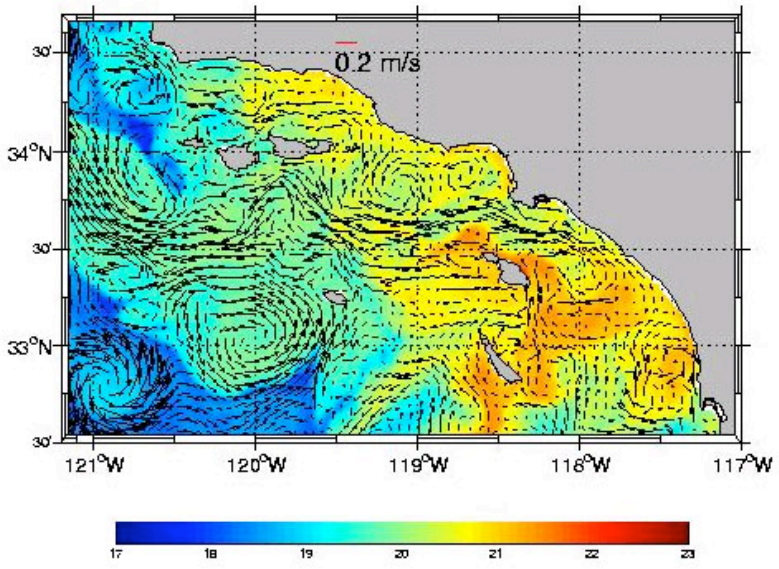
- *ROMS*
- *MM5 Winds*

Data description
Documentation

Variable:	Domain:	Forecast Hour at:	Depth at:	LAS:
Temp Sal Curr	SCB HB	14 (Day 1) (GMT)	0 (m)	LAS

Animation

Temp (°C, color) and Current (m/s, arrows) at 0m for 10/01/2006 at 14GMT



JPL OurOcean Portal

View Experiment Data

October 2006

Su	M	T	W	Th	F	S
01	02	03	04	05	06	07
08	09	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

<< < > >>

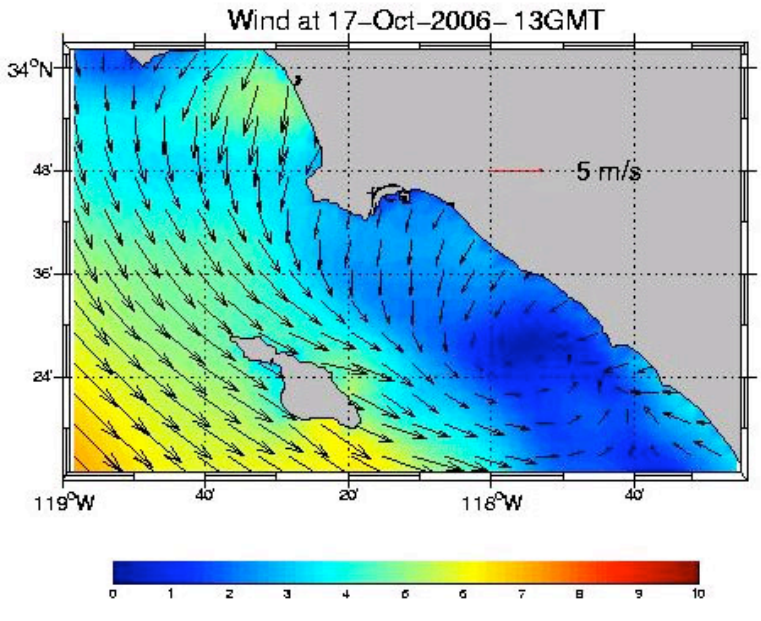
HB06 Products

- ROMS
- MM5 Winds

Data description
Documentation

Variable:	Domain:	Forecast Hour at:	LAS:
Wind at 10m	SCB HB	13 (Day 1) (GMT)	LAS

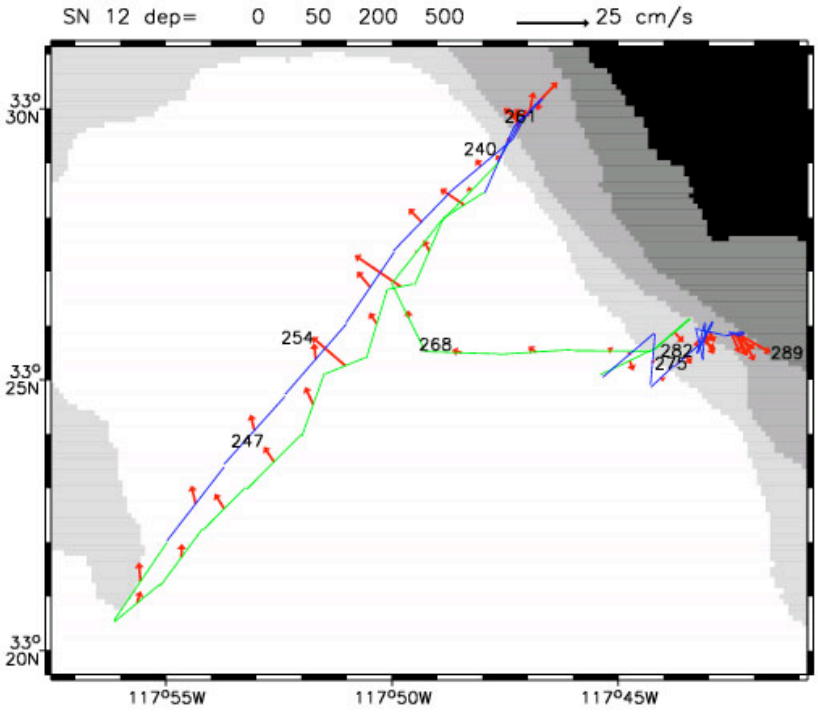
Animation



This page, http://ourocean.jpl.nasa.gov/HB06/, is maintained by Quoc Vu and was last modified on September 5, 2006

Mission ID = 06901201

perl command = rd_prof_plots.pl 239 289 012 /home/gs/public_html/data/069/06901201.SCI SoCalBgt.map 1 .1 T T
SN = 12, Deployed: 22-Sep-06, Location: Huntington_Bch, Number of Dives = 289



Please Input dive range and select type of plot to present:

Dives: 239 - 289

Track - Position and Current Plot: BORDER = .1 times distance between first and last selected dives

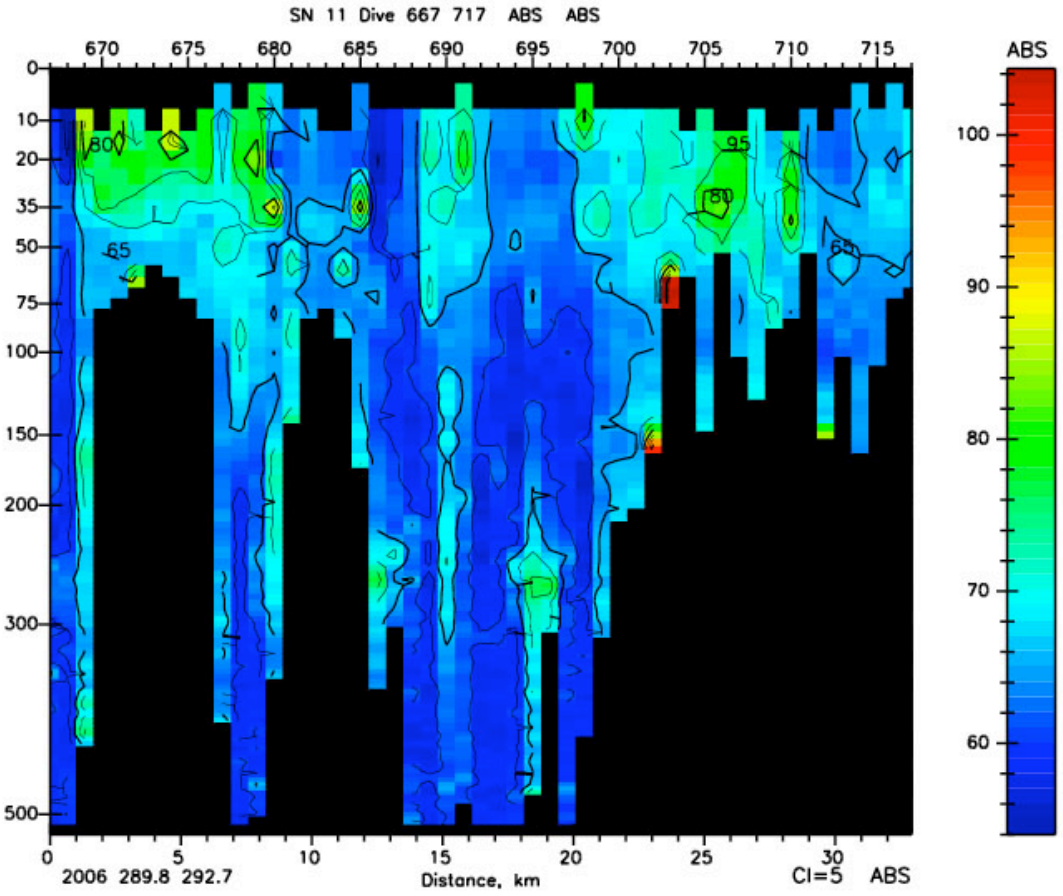
ENG - Engineering Data

Pixels	Contours
Temperature	Temperature

Section Plot Profile Plot

Mission ID = 06901101

perl command = rd_prof_plots.pl 667 717 011 /home/gs/public_html/data/069/06901101.SCI SoCalBgt.map 10 .1 B B
SN = 11, Deployed: 22-Sep-06, Location: Huntington_Bch, Number of Dives = 717



Please Input dive range and select type of plot to present:

Dives: 667 - 717

Track - Position and Current Plot: BORDER = .1 times distance between first and last selected dives

ENG - Engineering Data

Hyperion Diversion

SCCOOS Projects

Hyperion Diversion

Overview
About
Documents

Huntington Beach (HB06)

Local Environmental Information

Automated Shore Station
Meteorological Observations
Plume Tracking
Surface Currents
Surfzone Currents

Forecasts

- Winds
- Precipitation

Satellite Products

- OCM
  - Chlorophyll
  - Total Suspended Matter
  - True Color
- MODIS
  - Chlorophyll
  - $L_{wN}(551)$
  - Sea Surface Temp.
- Hourly GOES

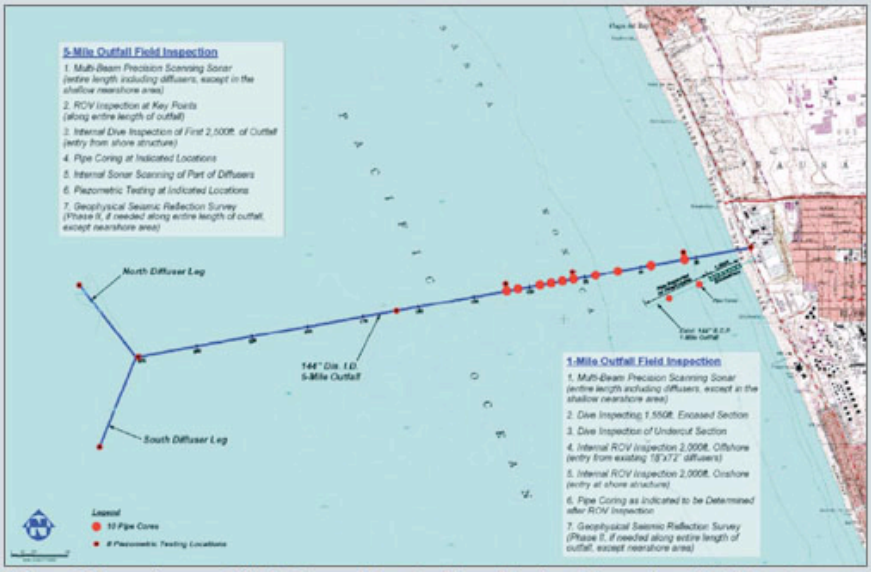
ENVIRONMENTAL DATA SUPPORT

FOR THE HYPERION 5-MILE OUTFALL INSPECTION

November 28-30, 2006

Geography of the Hyperion 5-mile diversion

The official City of Los Angeles Department of Public Works website.



Map of Hyperion outfalls in Santa Monica Bay. During November 28-30, the Hyperion sewer discharge will be diverted from the 5 mile pipe to the shorter One-Mile Outfall to allow inspection of the longer outfall pipe. The discharge is typically 300-350 million gallons per day, with a total estimated volume of discharge to approach 875 million gallons. The Southern California Coastal Ocean Observing System has created this web site to provide up-to-date ocean environment information to assist coastal managers during this discharge event.

Hyperion Diversion

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  - Sea Surface Temp.
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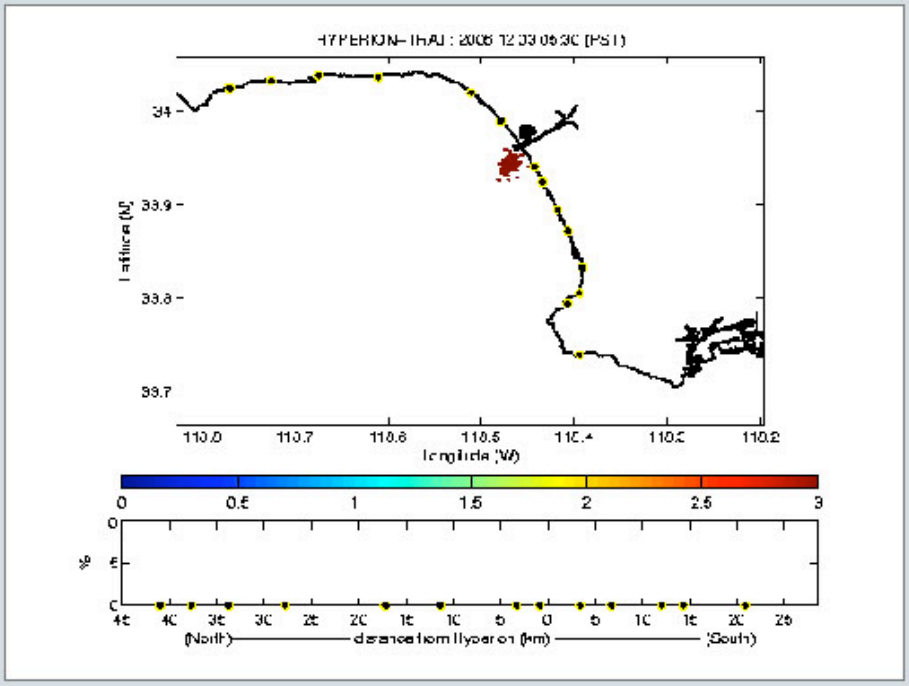
STORMWATER PLUME TRACKING

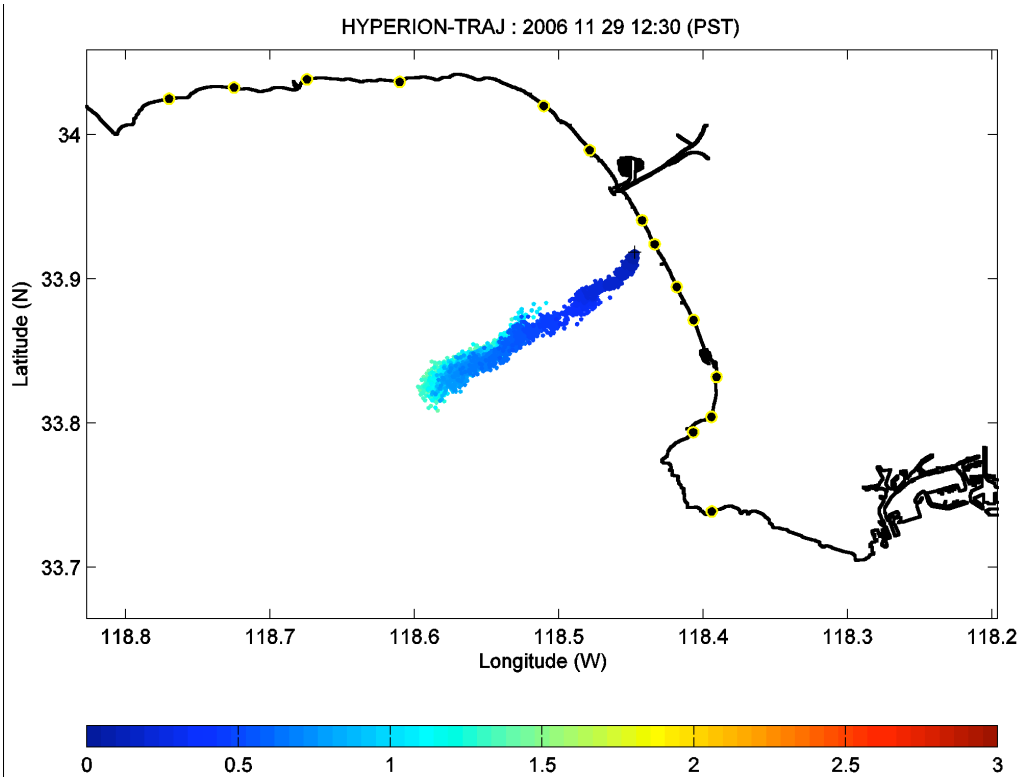
HYPERION OUTFALL

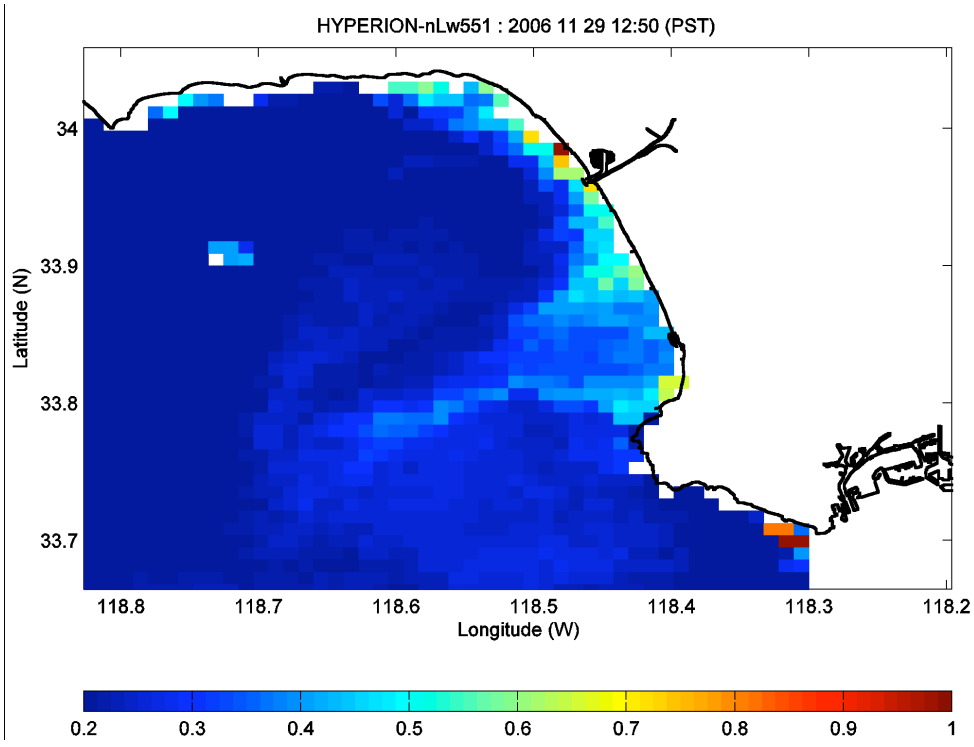
Start Animation 1/2 sec **Hourly Steps**

-119	-118	-117	-116	-115	-114	-113	-112	-111	-110	-109	-108
-107	-106	-105	-104	-103	-102	-101	-100	-99	-98	-97	-96
-95	-94	-93	-92	-91	-90	-89	-88	-87	-86	-85	-84
-83	-82	-81	-80	-79	-78	-77	-76	-75	-74	-73	-72
-71	-70	-69	-68	-67	-66	-65	-64	-63	-62	-61	-60
-59	-58	-57	-56	-55	-54	-53	-52	-51	-50	-49	-48
-47	-46	-45	-44	-43	-42	-41	-40	-39	-38	-37	-36
-35	-34	-33	-32	-31	-30	-29	-28	-27	-26	-25	-24
-23	-22	-21	-20	-19	-18	-17	-16	-15	-14	-13	-12
-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	END

An animated gif has been created as an alternative to this animation sequence.




HYPERION-TRAJ : 2006 11 29 12:30 (PST)
Latitude (N)
34
33.9
33.8
33.7
118.8
118.7
118.6
118.5
118.4
118.3
118.2
Longitude (W)
0
0.5
1
1.5
2
2.5
3


HYPERION-nLw551 : 2006 11 29 12:50 (PST)
Latitude (N)
34
33.9
33.8
33.7
118.8
118.7
118.6
118.5
118.4
118.3
118.2
Longitude (W)
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1

Hyperion Diversion

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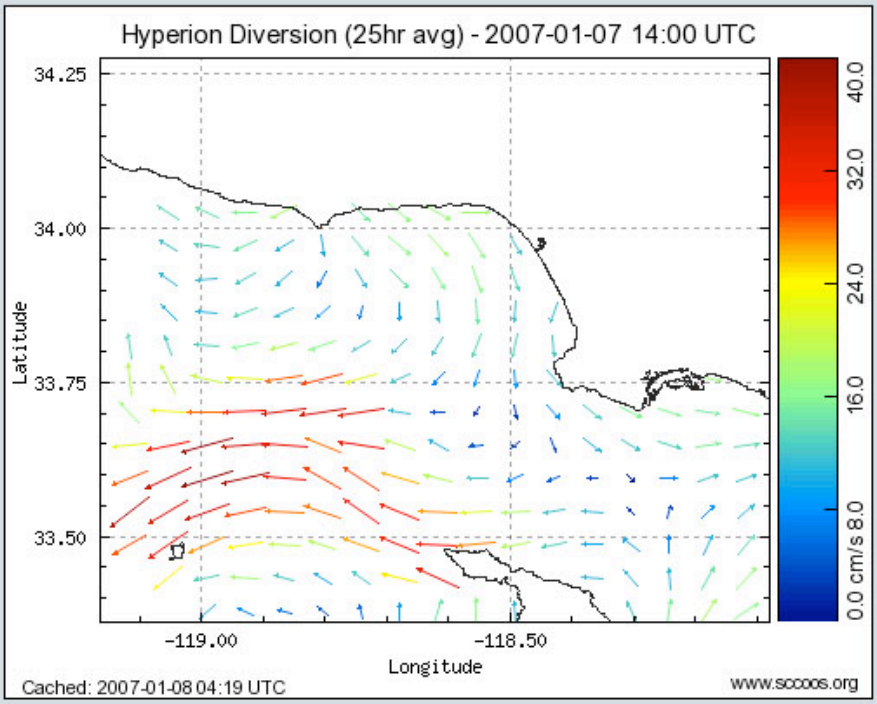
SURFACE CURRENT MAPPING

Latest Objectively Mapped Surface Currents

Objectively Mapped Surface Currents
Animation

HFRADAR Derived 25-Hour Averaged Map



For more currents, visit our interactive page.

Hyperion Diversion

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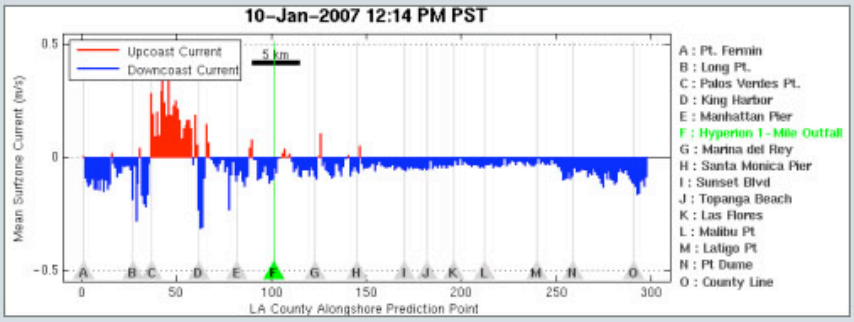
  - Sea Surface Temp.
- Hourly GOES

COASTAL DATA INFORMATION PROGRAM

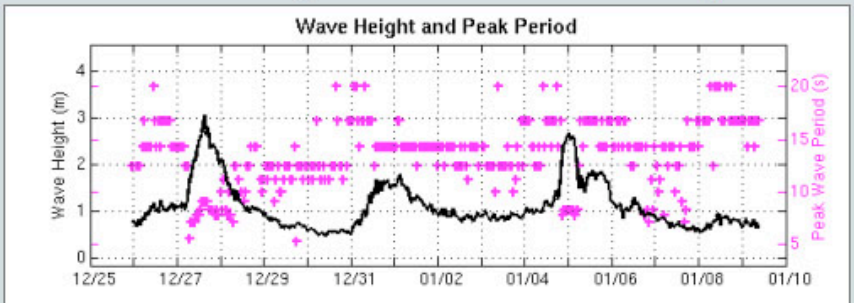
Nearshore Monitoring & Prediction Group

LA County Alongshore Surfzone Current Nowcast



LA County Alongshore Wave Height & Peak Period Nowcast

Recent Surfzone Wave & Alongshore Current Predictions Shoreward of Hyperion Outfall



Date: 2006-12-03 13:30 GMT (2006-12-03 05:30 PST)

Station ID	Station Name	Particle Count	Plume Potential
1	N1	0	NO
2	N2	0	NO
3	N3	0	NO
4	Malibu	0	NO
5	Santa Monica Beach	0	NO
6	Venice Beach	0	NO
7	Dockweiler Beach	0	NO
8	Hyperion	0	NO
9	Manhattan Beach	0	NO
10	Hermosa Beach	0	NO
11	Redondo State Beach	0	NO
12	Palos Verdes Estates	0	NO
13	Palos Verdes Estate	0	NO
14	Rancho Palos Verdes	0	NO

This display shows the results of a lagrangrian particle tracking algorithm applied to hourly surface currents. The plot indicates the tracking of surface waters from the Hyperion One-Mile Outfall. On an hourly basis, 100 particles are released at the outfall location and tracked for a 3 day period to provide an estimate of the spatial extent of the diversion discharge. New positions within the region are updated hourly and the color of the particle represents the age of the particle since it was released.

These computations and graphical displays are ***experimental*** and must be used with caution. While considerable effort has gone into ensuring the highest quality data, significant differences between measured currents and actual currents can occur. This information should not be used to make any navigational or other decisions that might endanger public safety or put anyone at significant risk. We reserve the right to ADD, CHANGE or DELETE any product WITHOUT PRIOR NOTICE.

APPENDIX E
DATA USERS AND PROVIDERS WORKING GROUP MEETING MATERIALS

SCCOOS brings together coastal observations along the Southern California Bight to provide information necessary to address issues in coastal water quality, marine life resources, and coastal hazards.

Working interactively with local, state and federal agencies, resource managers, policy makers, educators, scientists and the general public, SCCOOS will improve our understanding and delivery of coastal observations, and will allow us to better manage our coastal ocean environment.

JOIN US!

Southern California Coastal Ocean Observing System (SCCOOS) Working Group Meeting for Data Providers and Users

Join us for an overview of SCCOOS, a moderated discussion on optimal monitoring activities and data products, and an individual question and answer session with SCCOOS data managers. Working group categories include:

Water Quality

Marine Life Resources

Coastal Hazards

27 OCTOBER 2005
5:00PM
HUNTINGTON BEACH WATERFRONT
HILTON - SALON A

RSVP: Debbie Duckworth: 858.822.4097 (p)
dduckworth@ucsd.edu (email)

www.sccoos.org

Thursday, October 27, 2005 - 5:30 p.m.
Hilton Waterfront in Huntington Beach, Salon A

The Southern California Ocean Observing System
(SCCOOS)
Data Providers and User Groups (DPUG) Working Meeting

Stakeholder Comments and Feedback

Recommendations indicated by R - #.

A. Water Quality Breakout Session

Moderator: Jeff Crooks & Burt Jones; Recorder: Melissa Carter
Group Attendees: Lisa Gilbane, Jill Murray, Irwin Haydock, Don Schulz, Gregory McMahan, Barbara Cameron, Mark Malone and Bob Grove.

R-1: to provide access to data, quickly and easily. One idea is to organize the data by station or location to enable access by selecting location from a map or photo database (similar to http://www.californiacoastline.org/). This map interface might more easily show all the available data for a given site/location.

R-2: to provide the download of data in either txt, xls or matlab file formats; plus, have the option to plot the parameters that users are most interested in.

R-3: to have a focused Decision Maker Workshop in order to teach users how to use the technologies/data to help make more informed decisions. Jeff Crooks at the Tijuana National Estuarine Reserve Reserve mentioned that their Coastal Training Program could be of help with this type of outreach and training. Another option would be creating a video or providing online training/tutorials.

R-4: Other types of data that users are interested in included:

- Weekly or Daily Data - Data that is collected at a standard interval.
- TMDLs
- General Data: temp, salinity,
- rainfall/precipitation, meteorological data
- chlorophyll/Harmful Algal Blooms
- Sediment/ Turbidity
- fecal indicator bacteria (FIB) & pathogen data including source identification
- real-time data
- Integrating data types and plotting user-defined parameters (esp. satellite and ocean data)
- marine mammal strandings
- watershed data including stream flow, temp, etc.

- interfacing with management systems so that data required for permits is highlighted

B. Marine Life Resources Breakout Session

Moderator: John Hunter; Recorder: Dolores Wesson
Group Attendees: Susan Zaleski, Rick Pieper, John Hunter, Rick Ambrose and Stephanie Barger.

R-5: to provide better habitat maps that are easily available and are not outdated. E.g., bottom type, relief, etc. The CA Dept of Fish and Game (CDF&G) has paid for many surveys but availability and access is uncertain. This information is a priority for users but admittedly possibly outside of SCCOOS' scope.

R-6: to identify the location and trends of plant biomass, kelp beds algal cover and trends. A question remains: How far upstream will SCCOOS cover?

R-7: to monitor nearshore transport of larvae. Programs like the Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO) & the Cooperative Assessment of Nearshore Ecosystems (CRANE) are of value but maybe lack longevity. It is recognized that nearshore processes are useful but difficult to monitor. (See http://www.piscoweb.org/ & http://www.piscoweb.org/outreach/pubs/sharing3.pdf for details.)

R-8: to monitor non-indigenous aquatic species. This also is possibly outside SCCOOS' scope and might not be affordably accomplished.

R-9: to monitor wide-ranging fish stocks outside of the Channel Islands.

R-10: to monitor in wetlands and lagoons with a link to ocean boundary conditions. "To what degree is this monitoring effort integrated with SCCWRP?", was asked.

R-11: to monitor wave climatein the rocky intertidal habitats with high resolutionand to describe shore bottom habitat inside of 10 m.
R-12: to make programmatic ties with statutory mandates to increase relevance and likelihood of funding / success (program examples: HABs, Mussel Watch, Dept of F&G postings and announcements, Clean Water Act, eel grass beds, Essential Fish Habitat).

R-13: to look at parameters affecting HABs; provide time series of these factors and map distribution of blooms. Feedback was very supportive of embracing the old SIO data and dovetailing with the new system and documenting the connection of the old and new systems.

R-14: to have a small meeting with PACOOS, State agencies and SCCOOS to look at geographical boundaries and parameters to be observed by the various marine life resources stakeholders.

C. Coastal Hazards Breakout Session

Moderator: Michael Bateman; Recorder: Debbie Duckworth
Group Attendees: Walter Crampton, Rick Harter, Susan Brodeur, Michael Welin, Lesley Ewing and Julie Thomas.

R-15: to adapt the online SCCOOS data products so that users do not have to do any interpretative analysis. For example, CDIP wave data provides wave heights but not a range of potentially hazardous or tsunami-like waves. Usersshould not have to translate a particular wave height into an inference of a dangerous wave. Another example is that surface current/CODAR data is not readily useable to laypersons to determine the transport and fate of oil leakage or of a lost vessel/person. Interpretation of surface currents should instead be made and accessible for the users.

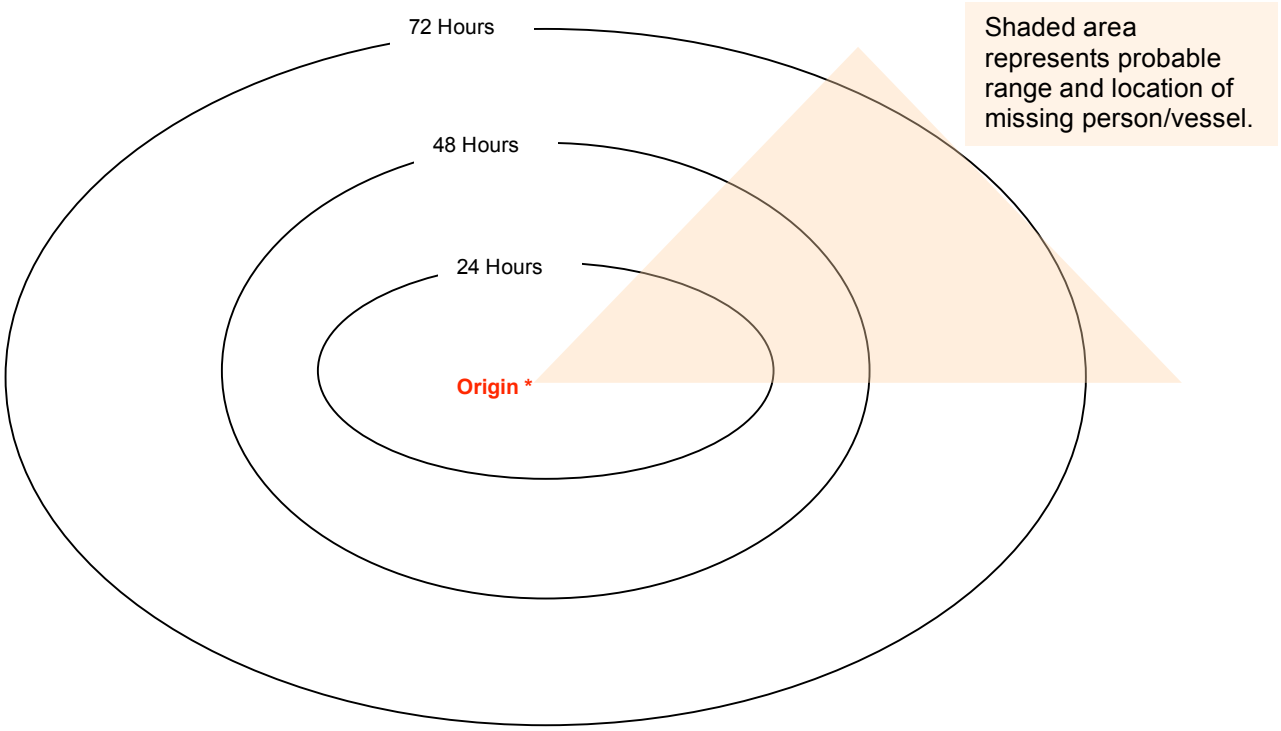
R-16: to have early warning protocols of notification for, for example, a tsunami. One possibility is that: in the event of a wave height detected greater than a threshold value, registered users receive an automated text/voice message on their phones or pager, and/or an email that serves as notification. (USGS uses a phone text messaging system like this. The one problem with this is that automated e-mails are often filtered out as spam.)

R-17: to increase the frequency and spatial coverage of water elevation meters along the coast to monitor El Niño and seismic activity. Areas along Northern California (Crescent City) are particularly at risk to tsunamis resulting from earthquakes in the Pacific. Furthermore, sensors off relatively remote areas such as the Oregon and Northern California Coast are necessary to provide sufficient warning in Southern California of an oncoming inundation wave. (The coast off Crescent City, CA provides a unique indication of the present tsunamis risk due to surrounding bathymetry and warrants more buoys there.)

R-18: to more thoroughly utilize municipal piers for the location of various sensors for monitoring.

R-19: to indicate the presence and provide 96-hour prediction of Santa Anna Winds.

R-20: to provide an interactive mapping tool to predict the location of missing persons or vessels. It should be kept in mind that this tool is for the panic-stricken with little time. The maps should have commonly known landmarks, particularly lifeguard headquarters, on the map to aid in coordination and bearing. The mapping tool should be able to receive the time and location of the object when last known and output incremental estimates of the probably transport and subsequent locations of the object. Incremental estimates should be available in 15 minute intervals. For example: on the map, original location could be centered among concentric circles showing the probably range of transport in terms of time. Probable location could be shaded to show most probable direction of transport. The following is provided as an example that was discussed; imagine the following graphic overlaying a map showing major landmarks and current directions. (This is to provide just an idea; a person trained in GIS could do much better.)



Other map-related comments that were made:

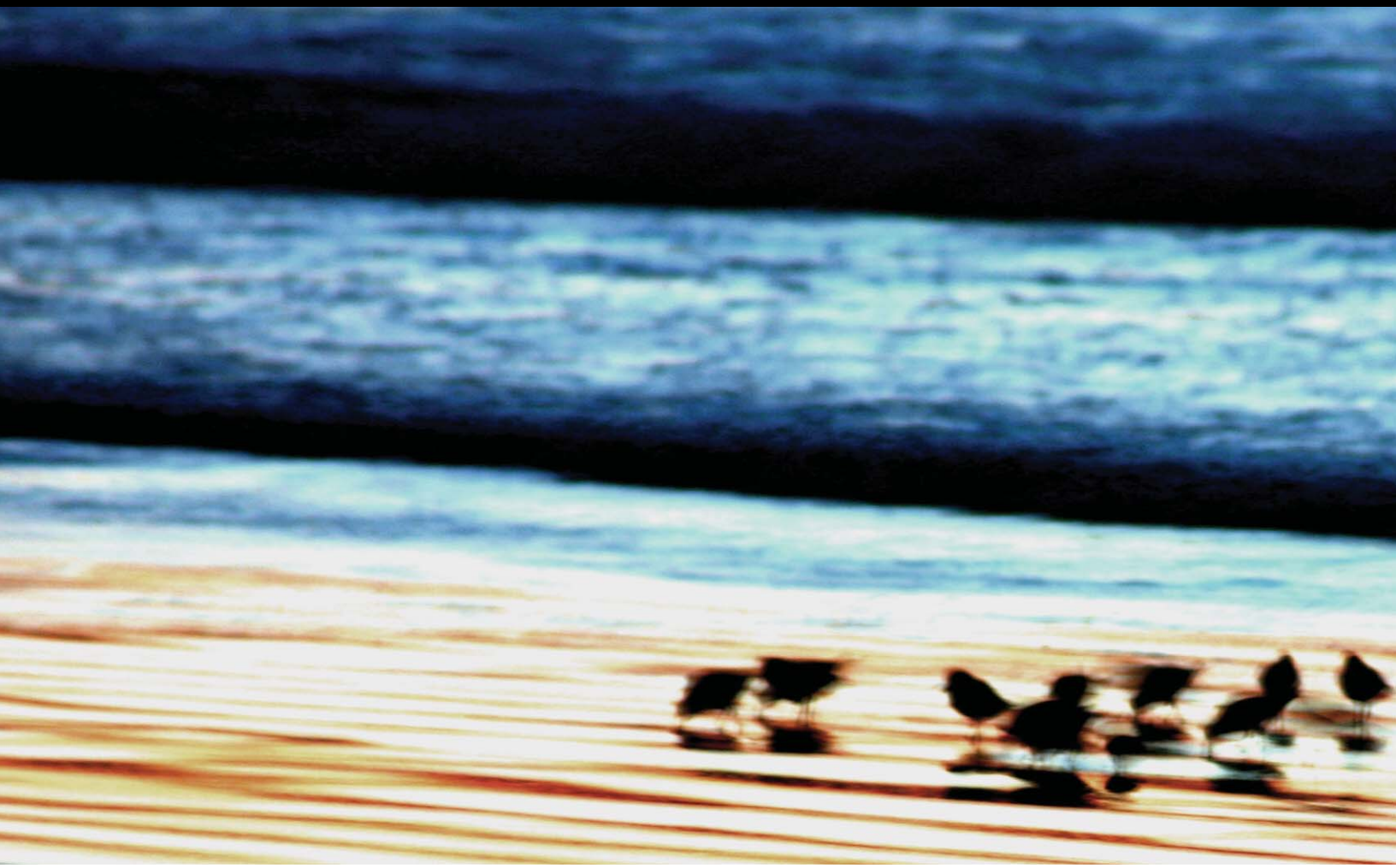
(1) Sandy Needles at USCG uses SCCOOS data with their own data.

(2) The interactive map for locating transport of missing objects or oil should be able to show change and predict near-future transport and direction.

APPENDIX F
SOUTHERN CALIFORNIA MARINE MONITORING CONFERENCE MATERIALS

SOUTHERN CALIFORNIA MARINE MONITORING CONFERENCE IV

24-25 APRIL 2006 · AQUARIUM OF THE PACIFIC · LONG BEACH



SPONSORS: *Catalina Conservancy Divers • Wrigley Institute for Environmental Studies • Aquarium of the Pacific's Marine Conservation Research Institute • Southern California Coastal Ocean Observing System (SCCOOS)*

WELCOME

Welcome to the fourth conference focused on marine monitoring efforts in Southern California. This conference historically has been hosted by Catalina Conservancy Divers and the Wrigley Institute for Environmental Studies at University of Southern California. This year the sponsors have been expanded to include the Aquarium of the Pacific's Marine Conservation Research Institute and SCCOOS, the Southern California Coastal Ocean Observing System.

BACKGROUND

In late 1997 representatives of USC Wrigley Institute for Environmental Studies (WIES) and the Catalina Conservancy Divers (CCD) met to exchange ideas on a range of topics. From that meeting emanated the idea of an annual conference to bring together researchers who specialize in marine research projects in the geographic region of Southern California. At such a conference researchers could share ideas, protocols, resources and research results. The first conference, held in 1998, brought together various researchers who presented an overview on their work.

A second conference was held in 1999 and again presenters provided overviews on their research efforts. The third conference was more oriented towards identifying all of the individuals and groups doing monitoring in the Southern California Bight.

The sponsors of Southern California Marine Monitoring Conference IV hope that the conference can further cooperation as well as the sharing of ideas, technology, protocols and data among those who are involved in marine monitoring efforts in the Southern California Bight. As sponsors, we are confident in knowing that

- the collective knowledge of the group is greater than the knowledge of any individual or group, and
- the sharing of this knowledge with those who are responsible for making decisions that impact the environment of the Southern California Bight can only lead to intelligent decisions.

THE SOUTHERN CALIFORNIA BIGHT

The Southern California marine environment is particularly unique in that it combines the cold water fronts from the north with the warm water fronts from the south. Their interaction combined with the Channel Islands creates a unique underwater environment. The Southern California Bight, also known as the Davidson Bight, creates unique water circulation patterns that only occur in Southern California.

The sources of water in the Southern California Bight include

- the cold, low salinity, highly oxygenated sub-arctic water brought in by the prevalent California Current which flows south along the coast of California,
- the warm, saline, central north Pacific water from the west, and
- the warm, highly saline, low oxygen content water entering the bight from the south.

The flows of these different waters are impacted by the location of the Channel Islands which are located in the bight.

CONFERENCE EVENTS

PROGRAM

24 APRIL

7:00pm **Reception & Poster Session** - ***Aquarium of the Pacific***

8:00pm **Dinner** - ***Aquarium of the Pacific, Great Hall***
Opening Remarks - *Dr. Anthony Michaels*

25 APRIL

8:00am **Breakfast** - ***Gameworks at the Pike***
Park in the parking structure nearest the Aquarium of the Pacific & walk across the street to the Gameworks facility.

9:00am **Conference Session 1** - ***Gameworks at the Pike***
The OOS - *Dr. Jerry Schubel*
SCCOOS - *Dr. Eric Terrill*
Channel Islands Marine Sanctuary Data Integration Experience - *Ben Waltenberger*
Southern California Marine Institute Data Integration Experience - *Dr. Rick Pieper*

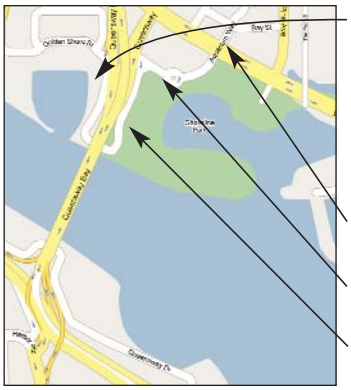
11:30am **Lunch**

12:30pm **Breakout Session**
Participants will be split into groups to address conference questions.

3:00pm **Conference Session 2** - ***Aquarium of the Pacific Honda Theater***
Representative from each breakout group will present answers to conference questions.

5:00pm **Adjourn**

SITE MAP



Lunch & brakeout session rooms
320/330 Golden Shore Drive (Above Catalina Express Terminal)

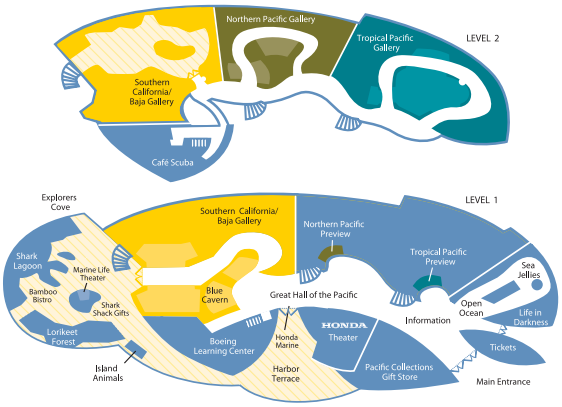
Gameworks at the Pike

Parking

Aquarium of the Pacific
100 Aquarium Way, Long Beach

VENUE MAPS

AQUARIUM OF THE PACIFIC



FOR DISCUSSION

CONFERENCE GOALS & OBJECTIVES

- Learn about different marine monitoring efforts in the Southern California Bight.
- Set the stage for ongoing collaboration among those involved in these marine monitoring efforts.
- Discuss how to integrate data to answer questions related to the marine environment.
- Explore opportunities to make data available to a broader user community through SCCOOS.

BREAKOUT SESSION QUESTIONS

1. What qualities/characteristics should SCCOOS develop to provide the framework for accepting, organizing, synthesizing, and delivering data/information collected by marine monitoring groups throughout Southern California that would be of potential interest to a wide range of stakeholders? Be as specific as possible in your list of requirements. What are some of the data and informational products that will be most useful for different stakeholder groups?
2. How can the various stakeholders retrieve and use these data and this information? What are the most important applications to different stakeholder groups?
3. What are some potential barriers to implementing data integration and dissemination and to fostering collaboration?
4. Create a list of existing and potential customers for marine monitoring data and information, and identify the kinds of data and information that would be most valuable to them.
5. From the list of data sets presented, pick two of the customers from Question 4 and identify all of the data sets you believe would be of most interest to them.

SPEAKERS

ANTHONY F. MICHAELS

Dr. Anthony Michaels (Tony) was born in San Diego, California and lived in a variety of locations around the world as a child. He split his undergraduate education between the University of California, San Diego and the University of Arizona. He did his Ph.D. research at the University of California, Santa Cruz, where he began research in biological oceanography and how the oceans affect the concentrations of greenhouse gases in the atmosphere.

After a postdoctoral fellowship at the Woods Hole Oceanographic Institute, he moved to the Bermuda Biological Station for Research, Inc. to develop an ocean time-series program and study the link between climate and how the oceans process greenhouse gases like carbon dioxide. This program developed into a premier site for the study of ocean biogeochemistry.

In 1993, as the catastrophe reinsurance industry in Bermuda began to expand, Dr. Michaels and Dr. Anthony Knap began to interact with these new companies. Through this process, they created a program called the Risk Prediction Initiative (RPI), a partnership between science and business. The RPI is designed to create new mechanisms for insuring against the catastrophic losses from hurricanes, earthquakes and other natural disasters.

After a seven-year stay in Bermuda, Dr. Michaels moved to Southern California in 1996 to become the first director of the new University of Southern California Wrigley Institute for Environmental Studies. The Wrigley Institute has facilities on both the mainland and on Catalina Island. It is involved in a wide variety of marine and environmental science research and education, as well as efforts to make that research relevant, usable and understandable to decision makers.

The Wrigley Institute has created a unique ocean environmental biology group with research that spans the range from genes to global change. Interdisciplinary programs bring together biology, earth science, economics, policy, business, medicine and engineering. These new programs include efforts to understand a broad range of environmental risks, how those risks are quantified and how that information is used to make decisions. The Wrigley Institute also interacts broadly with stakeholders in such areas as fisheries, coastal water quality, conservation, human health and aquaculture. The new knowledge produced by universities is most valuable when the scientists are engaged participants in the decision process.

Dr. Michaels is also passionate about broadening environment education. We need a more informed society and a "K-to-gray" education philosophy, that reaches students of all ages, and must be part of both the science and practice of the environment. The science of the oceans and the environment can create excitement within the K-12 science curriculum at the same time that it gives future voters tools to make better decisions. Undergraduate and graduate training must prepare students with both the content and the tools for leadership, analysis and communication in a more complex world. The current generation of decision-makers must also be informed of the many new options made possible by new knowledge through partnerships, education and public outreach.

SPEAKERS

JERRY R. SCHUBEL

Jerry R. Schubel is president and chief executive officer of the Aquarium of the Pacific in Long Beach, California. He was president and chief executive officer of the New England Aquarium in Boston from 1994 to 2001, and dean and director of the Marine Sciences Research Center at the State University of New York at Stony Brook from 1974 to 1994. Under his leadership, the Center became known for excellence in fundamental research in coastal oceanography and for the development of innovative strategies allowing humans to live in harmony with their coastal environments. In 2005, an endowed Jerry R. Schubel graduate fellowship was created by the Center in recognition of Dr. Schubel's contributions to the evolution of the institution. Dr. Schubel has published more than 200 scientific papers in academic journals and has also written extensively for general audiences. He chairs the National Sea Grant Advisory Panel and is a member of the National Science Panel for the South Bay Salt Ponds Restoration (San Francisco Bay). He chaired the National Oceanic and Atmospheric Administration's committee assessing the effects on the San Francisco Bay of the proposed expansion of San Francisco International Airport and was a member of the science advisory board of National Public Radio's "Living On Earth" series. In 1997, Dr. Schubel was awarded an honorary D.Sc. degree by the Massachusetts Maritime Academy, and in 2004 he was named a National Associate of the National Academies. He is a former chair and vice-chair and a current member of the Marine Board, and chaired the Phase I Committee on the St. Lawrence Seaway: Options to Eliminate Introductions of Nonindigenous Species into the Great Lakes. Dr. Schubel earned a B.S. degree in physics and mathematics from Alma College, Michigan, a master's degree from Harvard University, and a Ph.D. in oceanography from the Johns Hopkins University.

ERIC J. TERRILL

Eric has a B.A. in Engineering and a Ph.D. in Physical Oceanography. His research focuses on air-sea interactions, physical and acoustical oceanography and technology development. Eric established and leads the local San Diego Coastal Ocean Observing System (www.sdcoos.ucsd.edu), with funding from the CA Clean Beaches Initiative. Project partners include the City of Imperial Beach and the San Diego County Department of Environmental Health. Eric was instrumental in establishing the region-wide Southern California Coastal Ocean Observing system (www.sccoos.org), and is the program lead for the SCCOOS component of the state-wide $21M Coastal Ocean Current Monitoring Program (COCMP), which includes the deployment of region-wide HF radar network for mapping ocean surface currents. He also leads programs in naval hydromechanics and air-sea interaction processes; this work resulted in a successful deployment of an array of autonomous vehicles into Hurricane Francine in 2004. Eric is a native Californian, and resides in Solana Beach with his wife and two sons.

BEN WALTENBERGER

Ben Waltenberger is a physical scientist with the National Oceanic and Atmospheric Administration (NOAA), Channel Islands National Marine Sanctuary (CINMS). He works with geographic information systems (GIS) and remote sensing technology to map and geospatially analyze data collected within the region of the CINMS. Ben primarily works in the CINMS aerial reconnaissance program, analyzing vessel and visitor use patterns in the Channel Islands region. During the CINMS Marine Reserves process, Ben and a colleague designed a public participation GIS decision interface (Channel Islands Spatial Analysis Tool (CI-SSAT) to allow stakeholders to intuitively view and understand the myriad of data used in the reserves planning process. Ben has worked on several committees dedicated to spatial data integration and sharing, both regionally and nationally.

SPEAKERS

RICK PIEPER

Dr. Pieper received his B.A. in analytical biology from the University of California, Santa Barbara (UCSB). He continued his education with an emphasis in marine biology at UCSB and received a M.A. in biology. After a summer at the Smithsonian Institution in Washington, D.C. he went to Graduate School in British Columbia, Canada, and completed his Ph.D. in zoology and oceanography at the University of British Columbia.

Dr. Pieper is presently the Director of the Southern California Marine Institute (SCMI) which is a consortium laboratory operated by the Ocean Studies Institute of the California State Universities (CSU) and the University of Southern California's (USC) Wrigley Institute for Environmental Studies. He has taught graduate and undergraduate classes at USC, CSU Fullerton, the University of Texas and Marymount College. Dr. Pieper is also a consultant in Pelagic Marine Ecology at BAE Systems (previously Tracor Applied Sciences) in San Diego. He is a member of the Southern California Academy of Sciences where he was secretary, vice president, and president. He was on the board of directors of the National Association of Academies of Science and was president of that organization. Dr. Pieper is also a member of the Oceanographic Society and the American Society of Limnology and Oceanography.

Dr. Pieper has over 30 years of experience in the marine science field. His major interests include the measurement and understanding of various temporal and spatial scales of biological interactions in the sea, and the interactions of the biological structure with physical oceanographic structure and variability. His present research is based around water quality monitoring in the near-surface waters off the continental shelf and in the Los Angeles River. His projects have also involved monitoring zooplankton abundances and water column temperature at a long-term mooring ten nautical miles off of the Los Angeles, CA breakwater. This project used acoustical sensors to measure zooplankton biomass every one-half hour at six different depths at the edge of the continental shelf in 100 meters of water. He has recently studied Thin Layers in East Sound (San Juan Islands) and has analyzed zooplankton data from the Arabian Sea JGOFS project. Dr. Pieper was also involved in the monitoring of the water quality in Marina del Rey, a small-boat marina in Santa Monica bay.

His past research has encompassed much of the oceanographic field. While earlier work was primarily on zooplankton and micronekton ecology, more recent interests cover the entire oceanic system, including fisheries, marine birds, long term environmental changes and environmental studies. Along with conventional sampling such as CTDs, box corers, instrumented net systems and other measurement techniques, he has developed and used high frequency acoustics to both direct biological sampling and to obtain real-time, rapid estimates of zooplankton and micronekton abundance and distributions.

Dr. Pieper has published numerous articles in scientific journals and books, as well as reports on various studies. He has been an invited participant in oceanographic, acoustics and sampling workshops. He has been a periodic member of various GLOBEC working groups and has presented papers at many national and international scientific meetings. He has worked under the sponsorship of the National Science Foundation, the Office of Naval Research, the National Aeronautics and Space Administration and the National Sea Grant Program. He has conducted research and studies off of Southern California, Oregon, Texas, Florida, North Carolina, Hawaii, British Columbia, England, Ireland, Costa Rica and in the Indian Ocean.

SPONSORS

AQUARIUM OF THE PACIFIC - MARINE CONSERVATION RESEARCH INSTITUTE

The Aquarium of the Pacific's Marine Conservation Research Institute (MCRI) was established in late 2001 "to expand and enhance the body of scientific knowledge relating to the Pacific Ocean, its inhabitants, and ecosystems and to preserve this valuable resource for future generations through research, conservation, and education focused around the Aquarium of the Pacific."

MCRI research efforts are primarily focused on species propagation. Because of the confined nature of the diverse habitats at the aquarium, including California/Baja, the northern Pacific and the tropical Pacific, we have a unique opportunity to study and observe lifestyles of various species in a controlled micro-environment. As a result, we have formed collaborative efforts with various researchers and institutions to focus on understanding the life and reproductive cycles of various species on display in the aquarium. MCRI also has research links to a variety of educational institutions and links with researchers at these institutions to help them fulfill their Broader Impact/Criterion 2 requirements.

MCRI conservation efforts are focused on delivering a message of urgency to the public about the state of our oceans and encouraging actions that lead to the conservation of the Pacific Ocean and its inhabitants. Working with other major public aquariums in California, MCRI laid plans to develop a new Ocean Agenda for California. At the California and World Ocean '02 Conference (CWO 02) held in Santa Barbara, MCRI presented a plan to update California's Ocean Resources: An Agenda for the Future (Ocean Agenda). MCRI has also been a leader in presenting the results of the two major studies on the state of our oceans, the Pew Commission Report and the US Commission on Ocean Policy, both of which are maintained and indexed on the MCRI marine knowledge base along with other marine related reports, at http://mcri.publishpal.com/links?PHPSESSID=eb301278a96d1d96b6f788e2ad7a5092.

MCRI education efforts are directed at enhancing the dialog between the scientific community and the public by bringing lecturers to the aquarium to speak to the public on their fields of expertise. MCRI also has had the lead for the aquarium in its ocean literacy initiatives. MCRI was the first organization in the nation to host a regional workshop with leading scientists to develop the scientific content that they thought every resident of a major region (Southern California) should know about how the ocean affects them and how they affect the ocean. This was followed by a workshop in which leading informal science education experts outlined ways of delivering this information to the public that would engage, educate and empower them. Because of this leadership role, MCRI and the Aquarium of the Pacific have been asked to be one of only five satellite downlink sites as part of the national Conference on Ocean Literacy that will be held in Washington, D.C. in June 2006.

SPONSORS

SOUTHERN CALIFORNIA COASTAL OCEAN OBSERVING SYSTEM (SCCOOS)

The Southern California Coastal Ocean Observing System (SCCOOS) is a consortium of eleven universities and organizations launched in September 2004 to implement and evaluate new sensor and information technologies to facilitate the creation of an integrated, multi-disciplinary coastal observatory in the Southern California Bight. Consortium members include the California Polytechnic State University, San Luis Obispo (CalPoly), the University of California campuses at Santa Barbara (UCSB), Los Angeles (UCLA) and Irvine (UCI), the Jet Propulsion Laboratory, University of Southern California, Cal State Los Angeles, the Southern California Coastal Water Research Project (SCCWRP), Scripps Institution of Oceanography, the Universidad Autonoma Baja California (UABC), and Centro de Investigación Científica y de Educación Superior de Ensenada (CICESE). The SCCOOS governance structure includes a Board of Governors, made up of representatives of the eleven Consortium institutions, Executive Steering Committee, and Senior Advisory Committee.

A primary goal of SCCOOS is to provide policy makers and managers with a better scientific basis to evaluate and design new management strategies and manage risks. SCCOOS brings together agencies and data provider and user groups to streamline, coordinate, and further develop individual institutional ocean observing and monitoring efforts. Real-time observations, model and database forecasts, and a flexible information distribution system will provide critical information to agencies, managers, and end users. SCCOOS will integrate data and projects from local, state, and federal and individual activities to create an integrated, multidisciplinary coastal observatory. SCCOOS is committed to leveraging infrastructure, partnerships, and other resources to develop a fully operational coastal observing system to address a variety of policy, monitoring, and management needs.

Since its inception, SCCOOS has engaged in developing stakeholder support at the local, regional, and state levels as encouraged by the Ocean.US IOOS initiative. The SCCOOS consortium provides the framework for a collaborative network of southern California's leading institutions and laboratories which are conducting tens of millions of dollars of research that is essential to supporting several coastal resource management initiatives with a focus on improving water quality, supporting fisheries management (the CALCOFI program), protecting marine life, and predicting and mitigating coastal hazards. These activities are relevant to the broader goals of both State initiatives (e.g., The Clean Beaches Initiative and the California Coastal Nonpoint Source Pollution Control Program) and federal initiatives (e.g., IOOS, the NSF Ocean Observatories Initiative [OOI], and the Oceans and Human Health Initiative).

SPONSORS

WRIGLEY INSTITUTE FOR ENVIRONMENTAL STUDIES

The mission of the USC Wrigley Institute for Environmental Studies is to encourage responsible and creative decisions in society by providing an objective source of marine and environmental science and fostering an understanding of the natural world among people of all ages.

With generous donations from the Wrigley family, the University of Southern California created the USC Wrigley Institute for Environmental Studies (WIES) to unify and advance USC's efforts in environmental education and research. Under the directorship of Dr. Anthony F. Michaels, the institute brings together new and veteran faculty, programs and facilities with a renewed commitment to objective and relevant environmental science.

The Institute serves as an umbrella for all of the marine and environmental programs at the university. WIES gives interested faculty and students from all disciplines a physical center for their work and a set of innovative programs to focus their attention on goals that are meaningful. It is here that researchers from many different fields can work together at understanding and solving society's toughest environmental problems and preparing solutions for the future. Perhaps our most important objective is to effectively communicate the findings of this truly interdisciplinary scholarship to the public, students of all ages and those who can effect positive environmental change.

The Philip K. Wrigley Marine Science Center (WMSC), located on Catalina Island just 20 miles off the coast of Los Angeles, is the heart of the Wrigley Institute. Generous gifts from the Wrigley family and many others have transformed the center into a state-of-the-art laboratory and teaching facility.

Catalina's proximity to an urban center and the island's protected status provide an excellent site for marine and terrestrial investigations. Eight laboratories accommodate up to 24 researchers and groups of up to 60 students. Housing can host 90 overnight guests and provide meals for up to 150 people. The lab is currently used by faculty and students from USC and other regional universities, and is available for a broad range of research and educational activities.

SPONSORS

CATALINA CONSERVANCY DIVERS

CCD is a membership support group of the Catalina Island Conservancy, a private, non-profit conservation organization dedicated to the preservation of the natural heritage of Santa Catalina Island. The goal of CCD is to assist the Catalina Island Conservancy in achieving its mission with respect to Catalina's marine environment. A scientific advisory board composed of a group of marine science experts provides guidance to the organization's research projects and training activities.

ABALONE RESTORATION PROJECT

In 1991, CCD divers introduced over 20,000 juvenile green abalone to specific sites around Catalina to enhance the severely depleted abalone population. The planting of abalone today is prohibited, so this project is currently oriented primarily to monitoring the progress of the prior plantings.

KEY SPECIES MONITORING PROJECT

CCD designed this project to document the underwater habitat around Catalina Island. Currently this project is conducted at seven sites including Cactus Bay, Church Rock, Casino Point, Italian Gardens, Little Harbor, Pumpernickel Cove and Eagle Reef. CCD scientific research divers periodically dive these locations and use scientific methods to document what they encounter. This is a long-term study to document changes to the marine ecosystems around Catalina.

KELP FOREST MONITORING PROJECT

CCD conducts this project within the protected marine refuge at the USC/Wrigley Institute for Environmental Studies outside Big Fisherman Cove near the Two Harbors area of Catalina. Within this refuge are permanent transect lines at depths of 15, 30 and 60 feet. CCD Scientific Research Divers have been monitoring giant kelp at this location since 1992 by measuring plant densities and growth rates. There are also ongoing efforts to monitor the populations and densities of sea urchins in the area.

MARINE THERMOGRAPH PROJECT

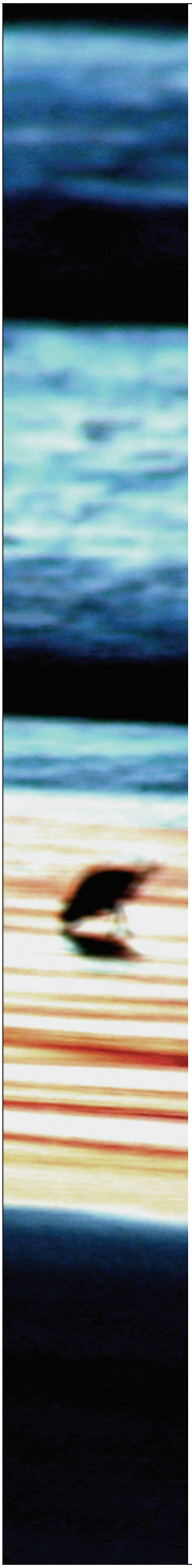
CCD has deployed marine thermographs (temperature recording devices) at four locations around Catalina at three different depths to record water temperature on an hourly basis. Water temperature data is available back to 1992, and it has been used by a variety of scientists in studying Catalina's marine ecosystem.

SCIENTIFIC RESEARCH DIVER TRAINING

CCD trains members to become scientific research divers and prepares them to become participants in CCD research projects. Training classes emphasize species identification and scientific research methods. Once divers have completed the basic training classes, instruction is expanded to include the specific protocols associated with the project in which an individual diver is to become involved.

SCUBA TRAIL

CCD educates recreational divers on the marine environment at Catalina by hosting the SCUBA Trail at the Casino Point Dive Park in Avalon. On selected weekends, CCD divers set out markers to help divers find and identify the common species found in Catalina's marine environment.



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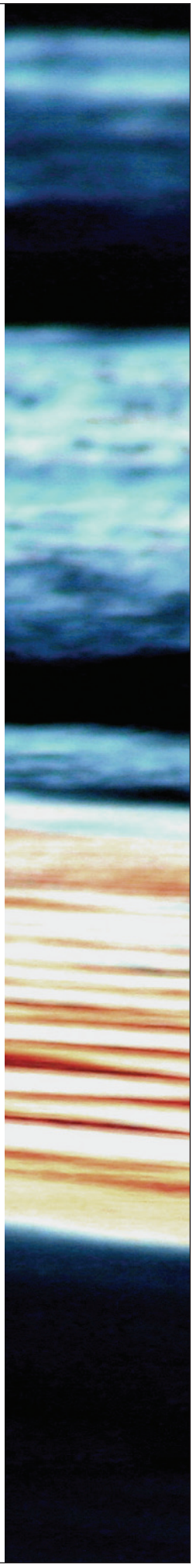

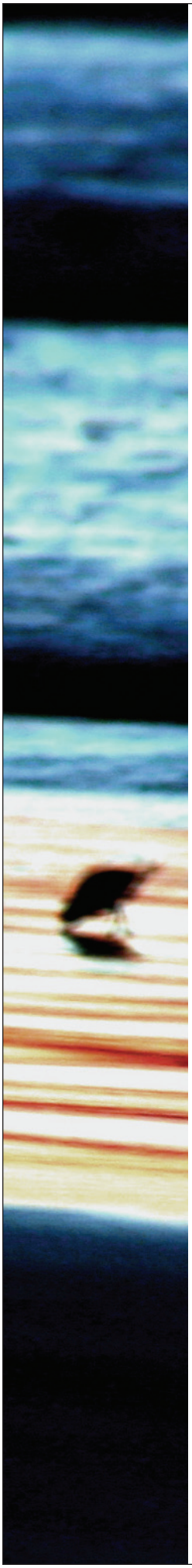

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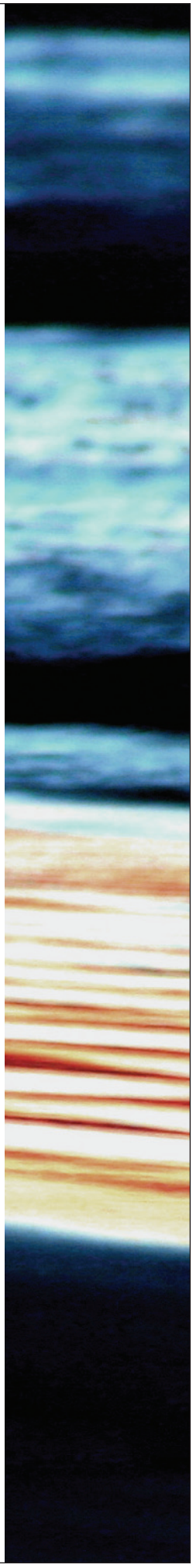

Southern California Marine Monitoring Conference IV

Summary of Break-Out Sessions

Aquarium of the Pacific
Long Beach, CA
April 25, 2006

What Qualities/Characteristics Should SCCOOS Develop To Provide Framework?

- The ability to obtain data / get permission
- Tailor data for different audiences
- Cover a vast range of data retrieving abilities
- Flexibility in data to look at large and small scale perspectives
- Water Quality / Pollution Impact
- Impacts on Human Health
- Baseline Info and Changes
- On-line forms for data submission and data requests
- Human being to contact for more information

What Qualities/Characteristics Should SCCOOS Develop To Provide Framework?

- Real time or summary data—they are handled differently.
- Wide range of data that needs to be integrated—oceanographic, physical and biological
- Multiple mechanisms for data input—automated vs human-done
- Easy to navigate and access
- Well described meta data—what are we looking at?
- Historical data sets are critical—not really monitoring without the long view
- Local and regional products—daily / long range
- Display in visually accessible manner
- Geographic display /index—small to large scale geo orientation
- Multi-lingual
- News alerts
- Ability to receive and distribute metadata
- Referrals to PI, or Data Managers and Collectors
- Layered information into cohesive
- One-stop shopping source—portal or gateway…start with SCCOOS!
- Common site linking so people don't know they are leaving SCCOOS
- Search Engine
- Spatial Context

What Qualities/Characteristics Should SCCOOS Develop To Provide Framework?

- Standardized ways to control and give data
- Agreed-upon format /strategy to share data
- Determine a way of providing data: Cafeteria or Gatekeeper?
- Two tiers of data: simple vs. complex—appropriate for use
- Assign a quality role. Assimilating like data
- Prepare aggregate data on CD, annually
- Include PDFs on website
- Include layered images

What Qualities/Characteristics Should SCCOOS Develop To Provide Framework?

- Application for oil-spill impacts—timely decisions for response
- Formats / Computer Literacy / Participation by Those Contributing Data
- Quality assurance for data content
- Lack of awareness by stakeholders of SCCOOS' existence and purpose
- Should not be proprietary, but credit should be given to provider
- Recognize need to determine the difference between certifiable and additional data that might add to knowledge and discussion
- User should be able to determine the difference in data quality and application and crediting
- Source of training for citizen groups
- Longevity

What Qualities/Characteristics Should SCCOOS Develop To Provide Framework?

- Meta Data—User should take the responsibility…? (volume)
- Organization based on a data base—query by field, spatial, temporal, author, common data types, etc.
- Synthesizing data: make as flexible as possible
- All data that come in should be public
- Products should be appropriate to all different uses—customize where necessary
- Various access options—international signage
- Provide data of water quality to National Weather Service. SCCOOS does not issue alerts, but helps those who do

Barriers to Data Integration, Dissemination and Collaboration?

- Funding, Funding Funding
- Lack of structure
- Calculation and processing limits by computer
- Scientific literacy of first time users
- Language issues
- Proprietary issues
- Delays in real time data
- Multiple locations of similar data
- Quality assurance of data
- Competing with data from other sites
- SCCOOS 'clearinghouse" for archived data from other sites
- Cross communication / Consistency and integrity of data from other sites
- Marketing of the SCCOOS sites
- Liability concerns…sewage example?
- Accountability
- Territorialism Concerns
- Integration Process Concerns
- Data storage
- Confidence in SCCOOS--level of commitment and data quality
- Resource protection—password protection

Our List of Potential Customers and Their Data Needs

- Fish and Game
- Private businesses
- Recreational groups
- Legislative
- Land Use
- Desalinization
- Tracking management
- Search and Rescue
- Sand Deposition Models
- Ocean Literacy
- Improve existing biological models
- Public Utilities
- Life Guards
- Pharmaceutical
- Oil and Mineral
- Coast Guard / Military

Our List of Potential Customers and Their Data Needs

- Teachers
- Students
- Local, Regional and Federal politicians / municipalities
- Resources Agencies
- Commercial users
- NGOs and Advocates
- Researchers
- Consumers of sea food
- Local sport , recreational and commercial fisherman
- THE AQUARIUM
- Commercial boaters
- Transportation Data
- Media
- General Public—swimmers, divers, boaters, fisher people, beach users
- Regulatory Agencies

Data Sets For Two Select Customers

- Commercial and Recreational Fisher people
  - Biological, historical data
  - Real time meteorological data
  - Trajectory data models
  - Pollution
- Regulatory Agencies
  - Raw data, but not for analysis—they may want to do it themselves
  - Regional data / Ecosystem data
  - Access to geographic information
  - Biological and Oceanographic data
  - Anthropogenic vs Natural Causes and How to Respond

Data Sets For Two Select Customers

- Public Health
  - Swimming advisories
  - Sea Food Watch
  - Dispersal and Propagation
  - Dissolved Oxygen
  - Rainfall /Atmospheric Conditions
  - Domoic acid

Data Sets For Two Select Customers

- General Public
  - How many times has this beach been closed?
  - Red tide?
  - Historical statistics covering any number of public concerns
- Policy Makers

APPENDIX G
EXAMPLES OF SCCOOS PUBLICATIONS

SCCOOS brings together coastal observations along the Southern California Bight to provide information necessary to address issues in coastal water quality, marine life resources, and coastal hazards.

Working interactively with local, state and federal agencies, resource managers, policy makers, educators, scientists and the general public, SCCOOS will improve our understanding and delivery of coastal observations, and will allow us to better manage our coastal ocean environment.

SURFACE CURRENTS

SALINITY

BIODIVERSITY

STORM RESPONSE

HABITAT MAPPING

SATELLITE IMAGERY

SWELL

WIND DIRECTION

WAVE HEIGHT

TURBIDITY

OCEAN COLOR

RESEARCH AIRCRAFT

PHYTOPLANKTEN

FISHERIES

FORECASTING

SHORE STATIONS

BACTERIA LEVELS

CIRCULATION

CURRENTS

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Jet Propulsion Laboratory, National Aeronautics and Space Administration

Scripps Institution of Oceanography, University of California, San Diego

Southern California Coastal Water Research Project

Universidad Autónoma de Baja California

University of California, Santa Barbara

University of California, Irvine

University of California, Los Angeles

University of Southern California

DATA PROVIDER USER GROUPS

Ecosystem Health, Restoration

Education and Outreach

Living Marine Resources

Maritime Operations

National Security

Natural Hazards

Public Health/Water Quality

Weather/Climate

SOUTHERN CALIFORNIA COASTAL OCEAN OBSERVING SYSTEM

www.sccoos.org

SOUTHERN *California*

Coastal OCEAN OBSERVING *System*

STORM SURGE

ZOOPLANKTON

SEA BIRDS

WIND SPEED

CLIMATE

AIR-SEA EXCHANGE

EROSION

SAND VOLUME

WATER TEMPERATURE

OCEAN BUOYS

SOLAR RADIATION

www.sccoos.org

SOUTHERN CALIFORNIA *Coastal Ocean Observing System*

SOUTHERN CALIFORNIA COASTAL OCEAN OBSERVING SYSTEM

www.sccoos.org

SCCOOS is supported by local, state, federal, and private funding.

TARGETED OBSERVATIONS SUPPORTED BY NOAA & STATE OF CALIFORNIA FUNDING

Surface Currents, Subsurface Currents, Surfzone and Nearshore Currents, Subsurface Water Properties, Sea Level, Satellite Observations, Surface Meteorology

PLANNED PRODUCTS & APPLICATIONS

Water Quality

When coupled with compliance-based water quality monitoring, SCCOOS products will aid in identifying the source of pollution that impacts beaches and coastal waters.

SCCOOS will work with water quality agencies in Southern California to integrate agency monitoring data sets into the SCCOOS data system.

Oil Spill Response & Search and Rescue

Surface currents, waves, and wind fields observed and forecasted by SCCOOS will aid oil spill response and prevention, and search and rescue operations.

SCCOOS products will support federal (USCG, NOAA HAZMAT, USN, EPA, FAA), state (CA Office of Spill Prevention and Response), local (port districts, shipping and oil industry, marine safety offices) agencies, and the petroleum refinery and transport industry.

Marine Resources and Marine Protected Areas

SCCOOS will provide velocity and temperature products to federal (National Marine Fisheries Service, National Ocean Service), state (CA Fish and Game), and other interested parties, including nongovernmental organizations.

Coastal Erosion

Data products to aid management issues related to coastal erosion depend on measurements and predictions of the alongshore wave climate and nearshore currents.

SCCOOS will provide products to local municipalities, the California Coastal Coalition, state (Department of Resources), and federal (Army Corp of Engineers, FEMA, NOAA, MMS) agencies.

Vessel Traffic Aids

SCCOOS will provide products to California Department of Boats and Waterways, Southern California port districts, USCG, NOAA, USN & other interested organizations.

K-12 & INFORMAL EDUCATION

SCCOOS has partnered with California Centers for Ocean Science Excellence in Education (CA COSEE) and the Ocean Institute in Dana Point to develop programs designed to meet K-12 Earth Science standards on the water cycle and weather. These programs will include new classroom activities, science kits, CDROMs, Web-based materials, field trips, and teacher professional development, and will incorporate SCCOOS science and scientists as a link to research being done in the field. Curriculum development for this program will include teacher focus groups and training sessions which will develop a program that effectively helps prepare students for California science standards and rigorous new assessments.

Sea bird (left) and pier photos (above) provided courtesy of John Wooley.

SOUTHERN CALIFORNIA COASTAL OCEAN OBSERVING SYSTEM

SOUTHERN CALIFORNIA COASTAL OCEAN OBSERVING SYSTEM

SCCOOS

aims to synthesize its observations into products that will provide a scientific basis for evaluating and improving management and guardianship of, and response to the ocean environment and its resources. SCCOOS will: make observations, collect real-time data, and develop models; convert these into products that are useful to the public, and to agencies and organizations interested in the ocean; and solicit feedback from these users on how these products can be improved.

TARGETED OBSERVATIONS SUPPORTED BY NOAA & STATE OF CALIFORNIA FUNDING

(to be available in a 1-3 year time frame)

Surface Currents

- Maps of surface currents will evolve in their sophistication. Initially, velocity maps from quality controlled, high-resolution (1 km) and long-range (6-10 km) HF radar (Surface Current Mapping Hardware) observations will be available. Later, data-driven surface current maps from the regional ocean modeling (ROMS) assimilating models will provide seamless current maps extending from the beach to waters offshore. Both real-time and archived data will be publicly available by Internet in both graphical form and as data files for downloading.
- Trajectory analyses based on the spatial surface current information will describe the motion of water parcels as a function of time from particular origins. Trajectories will be available in real time from key locations (e.g. potential discharge sites). Data archives will be maintained in various formats as defined by key users.

Subsurface Currents

- The three Coastal Ocean Currents Monitoring Program (COCMP) gliders *(buoyancy driven underwater robots that can be deployed for 6 months)* and the Santa Monica Bay mooring, three NOAA gliders and moorings near La Jolla and Santa Barbara, and current profilers from the Orange County Water District and other agencies along the coast will describe subsurface currents. These data will be used to constrain the ROMS model and will be publicly available through a web page that shows recent time series of velocity from moorings and velocity sections from gliders.

Surfzone and Nearshore Currents

- Interactive web pages will provide real-time "nowcasts" of vertically-averaged alongshore currents between the shoreline and about 2 km offshore. The alongshore resolution will be a few 100m. The flow estimates, based on simplified models driven by observed winds, waves, and alongshore pressure gradients, will be updated at least daily.
- The wave momentum stress, which drives alongshore, surfzone currents, will be predicted for the Southern California Bight as an extension of the California Data Information Program *(cdip.ucsd.edu)*.
- During intensive month-long periods, additional observations will provide more comprehensive velocity products including vertical, horizontal, and temporal variation of the flow field on the inner shelf (within 2 km of shore, but seaward of the surfzone). Inner-shelf drifter trajectories will be updated every 3 hours, while surfzone flows are mapped with fixed flowmeters and drifters. All products will be useful for model calibration and validation and, given experience, these velocity fields may be combined to produce full, three-dimensional maps of nearshore flows.

Subsurface Water Properties

- Density stratification from all SCCCOS gliders, moorings, and the underway CTD sections from San Pedro to Avalon, and Ventura to Santa Cruz Island will be published in near-real-time by website.
- ROMS assimilated products will provide 3D fields of temperature, salinity, currents, and several biogeochemical parameters. The temporal resolution of these products will span scales from hours to years.

Sea Level

- ROMS will provide sea level nowcasts and forecasts as driven by baroclinic and barotropic tides, local winds, and remote forcing. Sea level predictions on the coastline will be available in real time on the web.

Satellite Observations

- Satellite observations of sea surface temperature and ocean color products, such as primary productivity, total suspended matter, chlorophyll, and diver visibility, will be available as overlays on surface current maps. Overlays will be created in near-real time, integrated with other observations, and archived online.

Surface Meteorology

- Maps of surface wind fields and other meteorological properties (e.g. air temperature, relative humidity) will be available at 3 km resolution daily. The daily report will include hourly predictions over 3 days for a domain spanning the Southern California Bight.

PLANNED PRODUCTS & APPLICATIONS

Water Quality

When coupled with compliance-based water quality monitoring, COCMP products will aid in identifying the source of pollution that impacts beaches and coastal waters.

- The transport processes that carry bacteria or other pathogens to the beach can be deduced using time histories of trajectory maps from regions of measured contamination. Statistical descriptors provide confidence in determining when ocean transport processes are favorable for contaminated water to reach specific locations. Applications may include the generation of risk indices, early warning tools for the start and end of beach contamination events, and notice of when beach water sampling should take place.
- Real-time, forecasts, and statistical archives of the criteria for when NPDES discharge plumes may surface can be created through coupling the EPA PLUMES model to observations and modeled fields of subsurface stratification.
- The fate, transport & dispersion of plumes from known stormwater discharges and outfalls can be determined from modeled and observed current fields. This will disclose which regions of the coastline and receiving waters are most exposed to stormwater discharge, cooling water from power plants, or brine from desalinization plants.
- Understanding when discharges may impact a region of the coastline will allow the development of adaptive management protocols to reduce the delivery of fecal bacteria or other materials to that region. For example, discharges could be timed to occur only when transport conditions are favorable to moving the discharge to a region of minimal impact (e.g. timing a dredge spoil release).

SCCOOS will work with the water quality agencies in Southern California to integrate agency monitoring data sets into the SCCOOS data system.

Oil Spill Response & Search and Rescue

Surface currents, waves, and wind fields observed and forecasted by COCMP infrastructure will aid oil spill response and prevention and search and rescue operations.

- Real-time surface currents and trajectories will allow the tracking of spills to aid clean up efforts.
- Real-time wind and wave fields will assist oil spill response personnel in deploying and managing operational assets (booms, spill response vessels, etc.)
- Statistical descriptions of circulation, wind, and wave fields can be used for assessing risk to existing and future sites where spills have a high probability of occurring.
- Surface currents, wind, and wave observations and forecasts are useful to search and rescue operations for both determining search regions and the deployment of recovery assets.

SCCOOS products will support federal (USCG, NOAA HAZMAT, USN, EPA, FAA), state (CA Office of Spill Prevention and Response), local (port districts, shipping and oil industry, marine safety offices) agencies, and the petroleum refinery and transport industry.

Marine Resources and Marine Protected Areas

- Statistical descriptions of surface trajectories help define egg and larval pathways connecting coastal marine communities, something that is particularly important in designing Marine Protected Areas.
- Determining dominant flow patterns and their interannual variability and climatic change is valuable for fisheries modeling, diagnosing environmental impacts on fishery productivity, and eventually factoring climate forecasts into setting fishing limits and fishery closures.

SCCOOS will provide velocity and temperature products to federal (National Marine Fisheries Service, National Ocean Service), state (CA Fish and Game), and other interested parties, including nongovernmental organizations.

Coastal Erosion

Data products to aid management issues related to coastal erosion depend on measurements and predictions of the alongshore wave climate and nearshore currents.

- Real-time and forecasted wave products for Southern California can be used as a predictive tool for assessing the extent of storm surge and storm driven erosion rates. The analysis and prediction of wave climate changes along the coastline will allow risk assessment of areas of high erosion on a regional basis (or within a littoral cell).
- The prediction of surf zone currents can be applied to models and forecasts of the alongshore transport of sediments, and define regions of accretion and erosion within littoral cells.

SCCOOS will provide products to local municipalities, the California Coastal Coalition, State (Dept of Resources), & Federal (Army Corp of Engineers, FEMA, NOAA, MMS) agencies.

Vessel Traffic Aids

- The ROMS model will provide hourly sea level predictions in sensitive regions to vessel traffic, including port entrances. The regional observing and modeling efforts will allow these to be driven by tides, local winds, and remote forcing.
- The real-time observations and predictions of waves, winds, and currents are of practical use to mariners for safe and efficient at-sea operations. User-friendly data web pages will be made available to the public.

SCCOOS will provide products to California Department of Boats and Waterways, Southern California port districts, USCG, NOAA, USN & other interested organizations.

sccoos.org

Partner Sites: Cal Poly, San Luis Obispo • Cal State Los Angeles • Centro de Investigación Cientifica y de Educación Surperior de Ensenada • Jet Propulsion Laboratory • Scripps Institution of Oceanography • Southern California Coastal Water Research Project Authority • Universidad Autonoma de Baja California • University of California, Santa Barbara • University of California, Irvine • University of California, Los Angeles • University of Southern California

10 September 2004

SOUTHERN CALIFORNIA COASTAL OCEAN OBSERVING SYSTEM

COASTAL TRANSPORT STUDY

San Pedro Shelf Region

The Southern California Coastal Ocean Observing System (SCCOOS) has received state funding for implementing an extensive set of physical observations in the San Pedro Bay area, a region selected because of its chronic water-quality problems and availability of historic data. A primary objective of the SCCOOS effort (planned for summer/early fall 2006) is to improve the predictive capability for transport and mixing in the nearshore region, which will allow for the generation of a variety of products for a wide audience of coastal users. Coastal waters, from the surf zone to the shoreline, are central to life in Southern California. SCCOOS aims to provide a better understanding of nearshore water quality and pollutants transport in the San Pedro Bay region.

Observation design and location(s) have yet to be finalized. Input and participation from stakeholders, as well as scientists and engineers not yet associated with SCCOOS, are sought, and will be key in defining the most effective observation parameters. Observations will be concentrated between the shoreline and about 2 km offshore (roughly 30 m water depth), a region that includes the surf zone (where waves actively break) and the transition zone between the surf zone and shelf. Surface currents farther than 2 km offshore will be monitored with HF radar. A month-long intensive period of observation will be supported by the broader regional observations that will be operated on a continual basis throughout Southern California.

Transition zone/seaward of surf zone

Two moorings will be deployed for three months centered on the month-long intensive observation period (Figure 1a). Each mooring will include a surface buoy holding a downward-looking ADCP *(acoustic doppler current profiler, which allows measurement of currents at different depths throughout the water column)*, a thermistor chain, and a bottom pressure sensor. Velocity and temperature data will be telemetered to shore in real-time for distribution through the SCCOOS data management system. For five three-day stretches during the month, 20 drifters will be repeatedly deployed in a grid spanning the transition zone. Drifter trajectories and surface current maps will be generated on an hourly basis and made available to the SCCOOS data management system.

AUV surveys will be obtained daily throughout the month. Current technology allows 12-hour deployments once per day. The survey pattern will be designed to cover the focus area within three hours in order to adequately resolve tidal motions. AUVs will be equipped with CTDs *(conductivity, temperature, depth sensors, which allow measurement of the temperature, salinity, and stratification of the water column)*, and upward- and downward-looking ADCPs. Data will be provided each day to the SCCOOS data management system for distribution on the Web.

The drifters, AUVs, and moorings will provide distinct and complementary velocity products, all of which will be useful for model validation. The fundamental contribution of the drifters will be a series of surface velocity maps. AUV ADCP data will yield subsurface maps every day. Moored ADCPs will give velocity data with fine resolution in both depth and time. With experience and knowledge of the relevant length and time scales, researchers may combine these velocity fields to produce full 3D maps of velocity in the transition zone.

Very nearshore/surf zone

A cross-shore transect of seven bottom-mounted pressure sensors and acoustic doppler velocimeters will be deployed on a cross-shore transect between the shoreline and about 5 m depth (Figure 1b). Four additional locations, displaced in the along-shore direction, will be instrumented to estimate the along-shore variability of waves and currents. During the month-long surf zone deployment, approximately 15 drifters will be repeatedly released/retrieved/reseeded along several kilometers of beach for ten days. Bathymetry will be measured with a GPS-equipped jet ski, and the surf zone and transition region drifter deployments will be coordinated. An interactive point-and-click Web page with a real-time "nowcast" of nearshore waves and (vertically and surf zone-averaged) along-shore currents, will be developed for San Pedro Bay (Figure 2). Modeling will include simulation of pollutant dispersal (Figure 3).

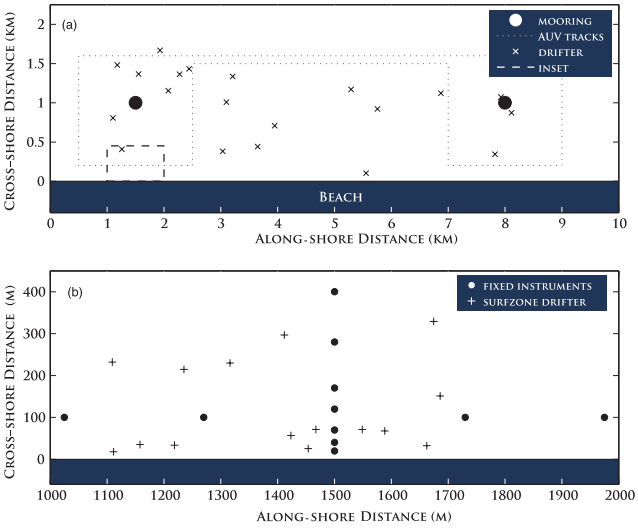


Figure 1: Schematic of anticipated nearshore instrument deployment: (a) entire nearshore region with two moorings located 1 km from shore in about 15 m water depth, AUV tracks and 20 example drifter locations. Bold, dashed lines indicate surf zone region expanded in panel b. (b) Surf zone region (spans 1 km along-shore and 450 m cross-shore) with locations of fixed instruments, and example surf zone drifter locations. The AUV tracks intersect the surf zone observations, and one of the moorings continues the surf zone transect.

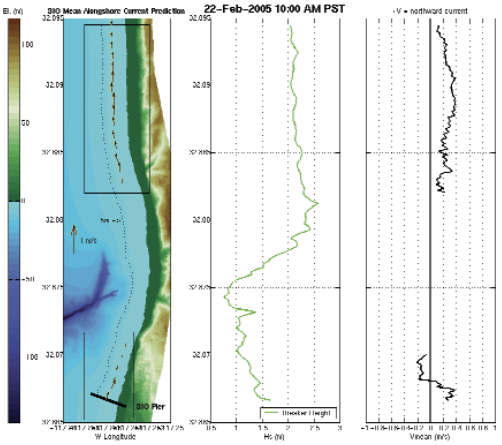


Figure 2: High along-shore resolution "nowcasts" (along-shore resolution of 200 m) of wave height at the seaward edge of the surf zone (middle) and surf zone-averaged along-shore currents (left and right) near Scripps Canyon (San Diego). Similar "nowcasts" will be produced for San Pedro Bay.

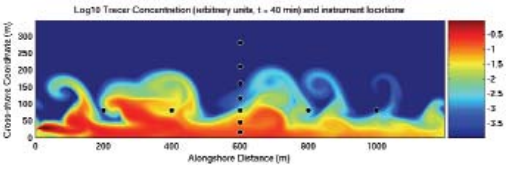
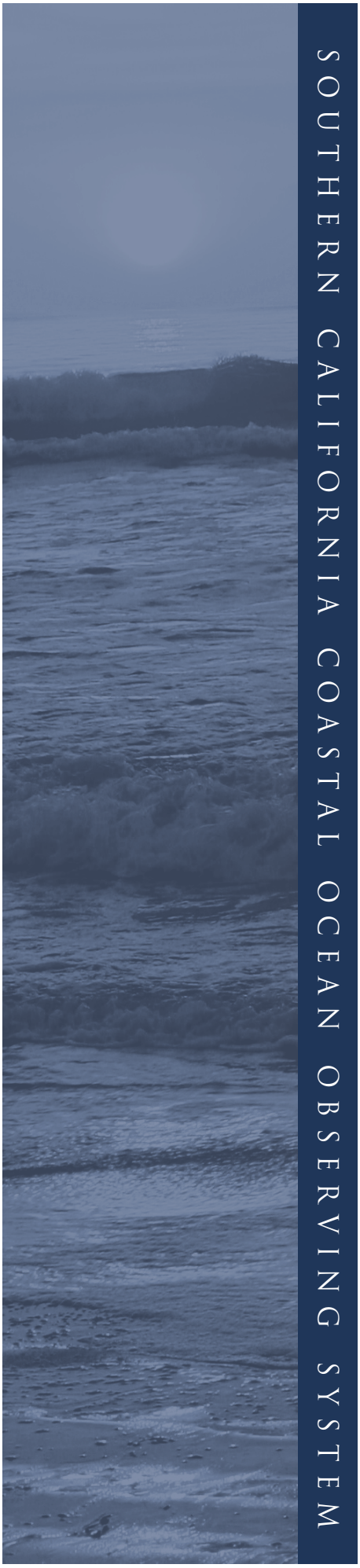


Figure 3: Sophisticated numerical modeling provides predictions for the dilution and residence time of constituents introduced at the coastline (e.g., stormwater). This figure shows numerical simulation of pollutant dispersal in the nearshore. Pollutant, continuously released at coordinate (0,0) (lower left-hand corner) for 40 minutes, has been advected to the right by the breaking wave-driven along-shore current and mixed seaward by instabilities of the along-shore current.



SOUTHERN CALIFORNIA COASTAL OCEAN OBSERVING SYSTEM

APPENDIX H
EXAMPLE OF SCCOOS NEWS

SCCOOS News and Events

May 2006 • In This Issue

News:

Events:

News

Presentation on HB06 to the Orange County Coastal Coalition

Dr. Robert Guza gave a presentation on the Huntington Beach 06 demonstration to

the Orange County Coastal Coalition on 27 April 2006. The presentation provided an overview of the project, observing system methodologies that will be employed, and application of the project results. Stephanie Peck of SCCOOS will be engaging regularly with Coalition members and also attended the meeting. Dr. Guza's presentation is available here (pdf). For more information about the Huntington Beach project, click here (pdf).

Southern California Marine Monitoring Conference IV explores marine monitoring data and integration

SCCOOS, the Aquarium of the Pacific, USC Wrigley Institute, and Catalina Conservancy Divers sponsored a conference on marine monitoring efforts in the Southern California Bight on 24-25 April 2006 at the Aquarium of the Pacific in Long Beach. The conference was attended by 65 representatives of federal, state and local agencies, coastal organizations and NGOs. Stated goals of the conference were:

- Learn about different marine monitoring efforts in the Southern California Bight region.
- Set the stage for ongoing collaboration among those involved in these marine monitoring efforts.
- Discuss how to integrate data together to answer questions related to the marine environment.
- Explore opportunities to make data available to a broader user community through SCCOOS.

SCCOOS played a key role in the conference with presentations by Dr. John Orcutt, Dr. Eric Terrill, Dr. Burt Jones, Dr. Tony Michaels, and Dr. Rick Pieper, and participation of SCCOOS and SIO staff Jerry Wanetick, Karen Baker, Stephanie Peck, Julie Thomas, Lisa Hazard, Jen Bowen, and Paul Reuter.

Information about the conference, including breakout session notes, final attendance roster, and speaker presentations, will be available at the SCCOOS web site in the next week. To view the conference program, download the program here (pdf).

2006 Sacramento forum, The Coast and California's Watersheds: Investing in our Natural Infrastructure

On 19-20 April 2006, CalCoast, the Southern California Wetlands Recovery Project, and the California Watershed sponsored the 2006 Sacramento Forum focusing on the ocean and watersheds as natural infrastructure and on current legislative and initiative efforts to monitor, protect and restore California's coastline. SCCOOS was a co-sponsor of the event. For more information, visit the CalCoast website here.

California Ocean Protection Council considers state coordination role in ocean observing

The California Ocean Protection Council discussed a proposal at its meeting 20 April 2006 to create a program under the State Coastal Conservancy to coordinate ocean observing activities statewide. The proposal will be scheduled for Council consideration at its June meeting in Monterey. A copy of the staff report and proposal can be accessed here. Note: Comments are being solicited.

California boards and agencies consider coastal power plants once through cooling process

The California State Lands Commission on 17 April 2006 passed an advisory resolution indicating the commission's intent to not approve or renew leases for power plants that include once-through cooling technology unless the facility is in full compliance with Clean Water Act and state requirements. The resolution also urges the Energy Commission and State Water Resources Board to implement policies to eliminate the environmental impacts of once through cooling technologies from new and existing power plants in the state.

The California Ocean Protection Council in the same week adopted a resolution that urges the State Water Resources Control Board to implement stricter requirements and controls for power plants, encourages the formation of a technical review group and interagency coordination committee, and funds a study to examine conversation to alternative cooling or best available technologies.

Though the resolutions passed by the State Lands Commission and OPC are not binding and do not carry regulatory authority, environmental and industry representatives monitoring the issue are watching state action as a possible precursor to an eventual ban on the once-through cooling process in California power plants. For more information, download the State Lands Commission resolution as a pdf here (see Agenda Item V on Consent Calendar) and the California Ocean Protection resolution as a pdf here.

For a recent article in the ***San Diego Union Tribune***, see the *Seawater intake spurs outcry* here.

NASA signs agreement to launch Jason-2, the Ocean Surface Topography Mission

NASA announced 11 April 2006 it will be cooperating with NOAA, France`s Center for National Space Studies, and the European Organization for the Exploitation of Meteorological Satellites to launch the Ocean Surface Topography Mission in 2008. The satellite, named Jason-2, will increase scientists` understanding of ocean circulation during its three-to-five-year mission, as well as improve climate forecasts and measurements of global sea-level change. NASA will provide scientific instrumentation and launch services. NOAA will provide a satellite-control center, command station, and data services. To read more, click here.

New study addresses trash flow into Los Angeles waterways

A study released by the Coalition for Environmental Protection, Restoration and Development (CEPRD) examines ways to comply with a 1999 federal court order mandating that cities in Los Angeles County eliminate by 2012 all trash flowing through storm drains into local rivers and waterways.

The trash problem is especially apparent in coastal cities like Long Beach, which sits at the mouths of the Los Angeles and San Gabriel rivers. Each year, tons of garbage from storm drains upriver flow downstream into the ocean, littering local beaches and harbors. Trash is especially heavy after rainstorms.

Several cities have challenged the court order, claiming the policy of zero trash tolerance is unrealistic and too expensive. CERPD and other interested parties met at the end of March at the Aquarium of the Pacific to review the study and discuss the approaches outlined, including ways in which trash could be significantly, if not completely, reduced without bankrupting local municipalities.

The study suggests a market-based model similar to "pollution credits" used in other industries. The goal is to make pollution reductions in the areas it would be simplest and most efficient, but then have a business that can reduce trash beyond their goals be able to sell its "credits" to businesses that cannot meet that standard.

The 18-month study cost $175,000, and was funded through federal, state and private grants. To read the article, click here.

San Diego Water Authority releases draft EIR on Carlsbad desalination plant
The San Diego County Water Authority released on 31 March 2006 draft environmental impact report which found that an ocean water discharged by the proposed Regional Seawater Desalination Project in Carlsbad would not harm sea life by discharging concentrated saltwater offshore, would not kill large numbers of fish larvae or other organisms, or raise ocean temperatures to unsafe levels for marine life. A study conducted last year by the project proponent, Poseidon Resources Inc., reached similar findings.

The County Water Authority conducted its own study and the environmental impact report is independent of Poseidon's. The Water Authority studied the project as if the authority was the developer.

The water authority proposes to blend the desalinated seawater with water imported into the county from other sources by infusing it into an aqueduct at San Marcos. Environmentalists have raised concerns about the harmful effects of desalination process on marine life. To view the related article, click here. The draft EIR can be accessed here.

Coastal Data Information Program dedicates a web display
The Coastal Data Information Program (CDIP) dedicated a web display program to the Ocean Institute in Dana Point on 25 March 2006. This exhibit (which includes an actual wave buoy) accesses data from the CDIP buoy deployed approximately 4 miles west of Dana Point. The exhibit will be used as an educational tool for all generations to further understanding of the principals of physical oceanography. The web display may be accessed here.

Ocean Observation System Coalition legislative update
The Ocean Observation System Coalition April Legislative Update is available online. The Update includes information on recent Senate and legislative IOOS activity in support of IOOS. Click here to download as a pdf.

State health officer advises consumers
The state health officer issued an advisory on 24 March 2006 to consumers about avoiding consumption of some shellfish and viscera of sardines, anchovies, and crab

from the Southern California coast. The official release can be viewed here as a pdf.

Oceanographic instrumentation theft
The Marine Technology Society (MTS) is interested in hearing from anyone who has had experiences with theft and vandalism of ocean instruments. MTS students have been working at the Southern California Marine Institute in procuring, testing and deploying the Center for Integrative Coastal Observation, Research and Education (CI-CORE) near terrestrial and ocean deployed systems. A waterproof instrumentation box was locked and instruments were secured with locks and chains, but a current meter was stolen and vandalism included opening an instrumentation box and leaving it exposed to flooding by seawater. The problems raise the issue as to the scale of ocean theft and vandalism. Contact Sam Kelly at skellycp@aol.com if you have experiences to share.

Public comment period still open for ocean research priorities plan
Although the JSOST Workshop for the Ocean Research Priorities Plan has now been held, the comment period for the Ocean Research Priorities Plan remains open until 15 May 2006. Input is being solicited to ensure that the themes and cross-cutting elements in the planning document reflect community input and consensus, and key research priorities.

Comments should focus on large-scale challenges and expected results within the research, technology and infrastructure needs and the Plan's themes to address those challenges. The Ocean Research Priorities Plan is not intended to be a delineation of detailed research efforts, but will be a broader Plan to address broad and far-reaching research initiatives and societal goals. For information on submitting comments, see: ocean.ceq.gov/about/sup_jsost_public_comment.html

Events

Training on Stormwater Treatment Best Managements Practices
2-3 May 2006 • San Clemente, CA

For more information, visit www.stormwaterbook.com/short_course.html

1st International Conference on the Application of Physical Modeling to Port and Coastal Protection (Coastlab06)
8-10 May 2006 • University of Porto, Portugal

The conference is of interest to all those involved with coastal modeling and strongly encourages the participation of researchers from the coastal sciences, engineers and those working at laboratory equipment suppliers.
For more information, visit paginas.fe.up.pt/~lpneves/coastlab06

River of Life Conference & Awards Banquet
19 May 2006 • Orange, CA

Sponsored by the Santa Ana River Watershed Alliance.

For more information, visit www.santaanariverwatershed.org/registration.html

SCOAR Airborne Ocean Science Conference
24-25 May 2006 • Moss Landing Marine Laboratories

Sponsored by the UNOLS Scientific Committee for Oceanographic Aircraft Research (SCOAR).
For more information, visit www.sccoos.org/news-UNOLS-24May06.html

Coastal Environment 2006
5 - 7 June 2006 • Rhodes, Greece

Sixth International Conference on Environmental Problems in Coastal Regions Including Oil and Chemical Spill Studies
For more information, visit www.wessex.ac.uk/conferences/2006/coast06

Capital Hill Oceans Week 2006
13-14 June 2006 • Washington, D.C.

For more information, visit www.nmsfocean.org/chow2006

Time Series of the Northeast Pacific
5-8 July 2006 • Victoria Conference Centre, Victoria, BC, Canada

A symposium to mark the 50th anniversary of Line-P
For more information, visit
www.pices.int/meetings/international_symposia/2006_symposia/Line-P/Background.aspx

30th International Conference on Coastal Engineering (ICCE 2006)
3-8 September 2006 • San Diego, CA

Sponsored by the Local Organizing Committee (LOC) of ICCE 2006 and the Coasts, Oceans, Ports, and Rivers Institute (COPRI) of the American Society of Civil Engineers.
For more information, visit www.ICCE2006.com

California and the World Ocean '06
17-20 September 2006 • Long Beach, CA

For more information, visit resources.ca.gov/ocean/cwo06

Oceans 2006 - Revolutionizing Marine Science and Technology
18-22 September 2006 • Boston, MA

Sponsored by IEEE Oceanic Engineering Society and The Marine Technology Society
For more information, visit www.oceans2006.org

53rd Annual Eastern Pacific Ocean Conference (EPOC)

27-30 September 2006 • Timberline Lodge, OR

For more information, visit damp.coas.oregonstate.edu/epoc2006

Ocean Optics Conference
9-13 October 2006 • Montreal, Canada

Conference topics include: Radiative transfer theory and simulation; Interdisciplinary topics addressing the ocean surface and interior; Interaction of light with shallow ocean benthos and substrates; Development and application of quantitative ocean color remote sensing; Coastal ocean monitoring and data management strategies; and Instrument design and validation
For more information, visit oceanopticsconference.org/home

sccoos.org